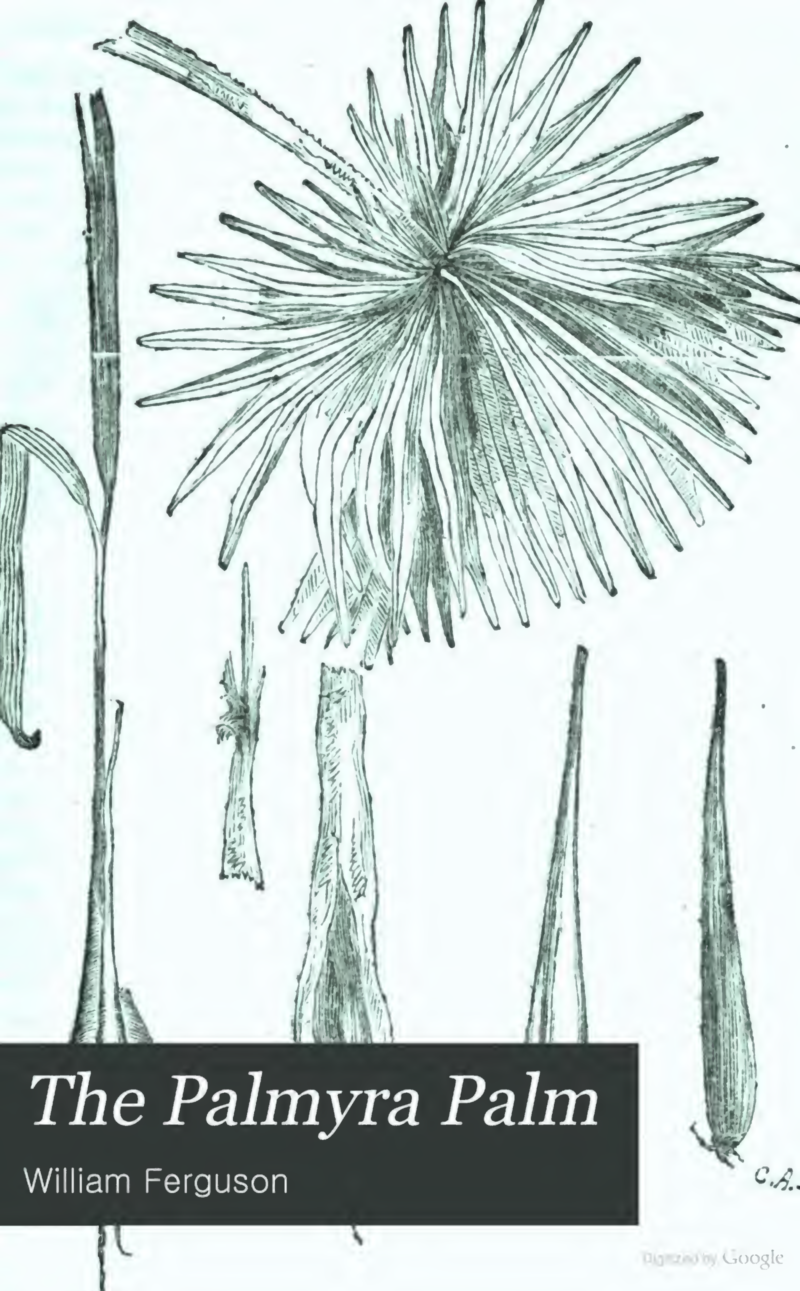

The Palmyra Palm

William Ferguson

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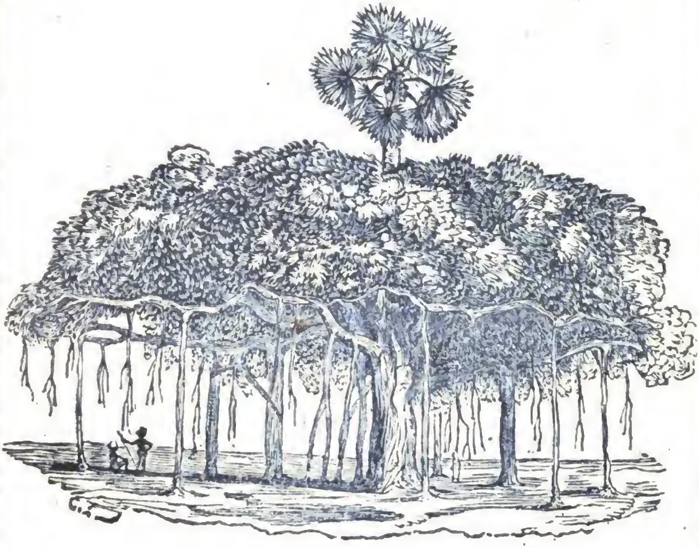
DESCRIPTION

OF THE

PALMYRA PALM

OF

CEYLON.



BY

WILLIAM FERGUSON.

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THE

PALMYRA PALM.

BORASSUS FLABELLIFORMIS.

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பனமரம

A POPULAR DESCRIPTION OF THE PALM AND ITS PRODUCTS, HAVING SPECIAL REFERENCE TO CEYLON.

WITH A VALUABLE APPENDIX,

Embracing extracts from nearly every Author that has noticed the Tree.

ILLUSTRATED BY WOOD ENGRAVINGS.

(FROM ROBERTS' ORIENTAL ILLUSTRATIONS OF THE SCRIPTURES.)

DEUT: XX. 19. "*Thou shalt not destroy the trees thereof by forcing an axe against them: for thou mayest eat of them, and thou shalt not cut them down (for the tree of the field is man's life,)*" *&c.*

Can it be a matter of surprise that the Orientals have a great aversion to cut down any tree which bears fruit when it is known that they principally live upon vegetable productions? Ask a man to cut down a Cocoanut or a Palmirah Tree, and he will say (except when in want or to oblige some great person,) "What! destroy that which gives me food? from which I have thatch for my house to defend me from the sun and the rain? which gives me oil for my lamp, a ladle for my kitchen, and charcoal for my fire? from which I have sugar for my board, baskets for my fruits, a bucket for my well, a mat for my bed, a pouch for my betel-leaf, leaves for my books, a fence for my yard and a broom for my house? Destroy such a tree! Go to some needy wretch who has pledged his last jewel, and who is anxious to eat his last meal."

BY

WILLIAM FERGUSON.

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PALMYRA PALM.

(Borassus Flabelliformis.)

In its various stages of growth.

Drawn by C. A. Lorenz: Engraved by Juan De Silva.

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INTRODUCTION.

—oo—

The following contribution to a natural and economical history of the Palmyra Tree, was commenced about 6 years ago, in consequence of a remark which occurred in a local Periodical, ("The Investigator") to the effect that Toddy was procured from the Cocoa-nut and other Palm trees by "INCISION."—This erroneous statement, with reference to our Cocoa-nut and Palmyra Trees at least, (for there are exceptions in regard to some of the Palms, as will hereafter be seen,)—induced me to draw up for the Editor of the Periodical alluded to, a short account of the Palmyra tree, and the mode of procuring the Toddy from it, as I was then stationed in a district of the Island where this tree predominates, and where many thousands of the inhabitants depend upon it for their chief support.—

After collecting a good deal of information on the subject, I wished to know what was said about it in Botanical works; but the difficulty I met in procuring the various Books to which I found myself referred, and the probability that a fuller and better description might be contained in those works than any I could possibly give, induced me to wait till I could at least refer to all the works procurable in Ceylon; and also until I had learned more of the natural history of the tree from my own more careful observation. Thus the matter lay over, and a mass of notes and extracts accumulated on my hands, sufficient, at length, to induce me to venture on their publication in this shape.

It is usual for some writers to state what they would consider satisfaction for their labors—May I be allowed to express a hope that those of my own Countrymen who, like myself, have been many years in Ceylon, may find this description of the Palmyra-tree, so ample and particular as to prevent for the future its being confounded by them with any other palm tree. There is a degree of pleasure involved in the mere collection and arrangement for the use of others, of information; such as I have here brought together, in regard to the most important of the Indian Palms next to the Cocoanut. This must be my chief reward,

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for I have no hope that in a pecuniary point of view the sale of the Pamphlet will repay the cost of its printing and "getting up."

It will be seen that the authorities I have consulted are very numerous. Where these state important facts, not already noticed by myself, they are acknowledged in the usual manner; and to avoid the *possibility* of my readers supposing me capable of taking credit for information as original which I borrowed from others, the various articles referred to will be given in the appendix if not quoted in the description.

The list of synonyms may not be useless to those interested in Oriental literature, and may, to some extent, show the connection between the languages and dialects spoken without the limits of the distribution of the Palmyra-tree.—Its use will be obvious to parties wishing to identify the tree in the course of their reading, particularly in Geographical Works.

This description is intended for the use of those who are perfectly unacquainted with Botanical nomenclature, and ignorant of any particulars about this tree, as well as for those who are pretty familiar with both; hence what perhaps will be considered by the latter class, the lengthened, and apparently superfluous definitions of Botanic terms &c. I have attempted to combine a scientific description with a popular account of the tree: with what degree of success my readers will judge.

For the drawings which are introduced into this description, I am chiefly indebted to Ceylonese Artists, Messrs. Lorensz, Koch and Nell; the engravings being executed by a self-taught Native, Mr. Juan De Silva.

May I hope to see the day when these gentlemen and others of their countrymen will combine to illustrate the Natural History of their beautiful native land, with their pens, their pencils, and their gravers; for I am sure it will be admitted, that if they applied themselves to the task, they are better qualified in many respects, than strangers, who generally do not remain long enough in the country to become familiar with the History of its natural productions, as known to the Singhalese, and of which perhaps many valuable notices will be found in the Native literature commencing about 2390 years ago, or about 540 years before the Christian era.

My acknowledgments are due and my thanks are tendered to many gentlemen who have afforded me access to books and supplied me with valuable information: especially to Geo: Lee, Esq., Post Master General of Ceylon; the American Missionaries at Madras and Jaffna; &c.

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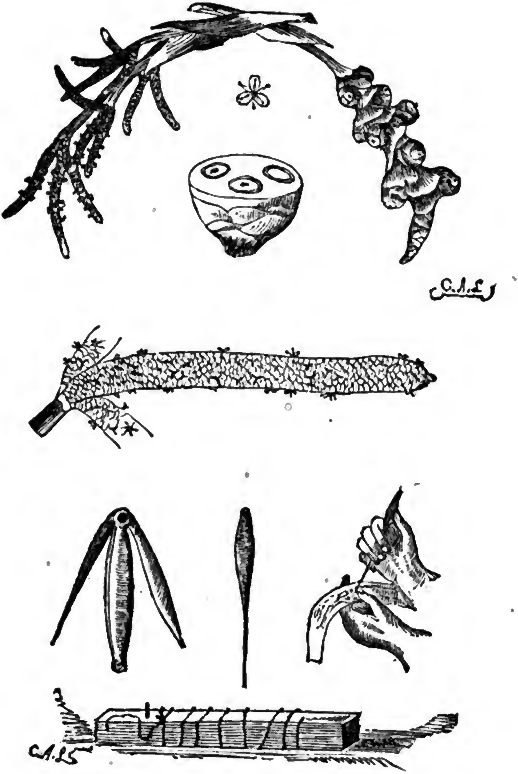

MALE INFLORESCENCE FEMALE.

MALE FLOWER

SECTION OF FRUIT.

AMENT OR CATKIN.

NATIVE KNIFE, STYLE, AND BOOK.

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BOTANICAL DESCRIPTION.

Borassus Flabelliformis.

PALMÆ OR PALMACEÆ.

No. I—Class 22 Diœcia, and Order 6 Hexandria.

The PALMYRA, (however erroneously, as will be seen by Dr. Buchanan Hamilton's Commentaries on Rumphius, as well as from other quotations, and notwithstanding the number of names and synonyms given to it,) is now known by all modern authors and Botanists of authority, as the BORASSUS FLABELLIFORMIS.—This is the name given to it by Linnæus.—*Borassus*, its *generic* name, a Greek word, is said by Brande* to mean the skin of the Date, whilst Dr. Hamilton states that it means the Spatha, (Sheath) common to most Palms. *Flabelliformis*, its specific name, is a compound of two Latin words—*flabellum*, a little fan, and *forma*, form.—It will thus be seen that however misapplied in some instances, and from whatever languages derived, Botanic names are not meaningless, as a vast number of persons suppose.—This then is the fan-form-leaved-spathaceous tree, a designation by no means distinct, other palms of different genera having Fan-leaves, and Spathes, or sheaths for their inflorescence.

It belongs to the Artificial, Sexual, or Linnæan Class DIŒCIA, and Order HEXANDRIA.—These terms mean that the Male and Female flowers are distinct, and also on separate trees, and that the Male Flowers have Six Stamens.

MALE FLOWERS ON A SEPARATE TREE.

The flowers of the male, like those of the female tree, are on a spadix, but so different in appearance are the Male spadix and its Florets from those of the Female, that many persons to whom I have in the course of my researches shewn them, could not even guess what they were, tho' they at once recognised the fruits on the Female spadix as those of the Palmyra. Unlike the female spadix the male is always divided into several smaller spadices, having a universal spathe "composed of many (from 10 to 14) " imbricated smaller spathes, each vaginated at the base, but soon splitting " into a long concave, pointed, boat-like sheath, in substance very strong " and fibrous; when young they are covered with a soft, downy, rust- " colored substance; sometimes in the lower axilla of the sheaths, there is " a bundle of smaller sheaths, forming a spathe like that now described, " but without spadix. The superior four or seven sheaths embrace each

* To avoid a mass of references, and figures in the body of the description, all the authorities, as already stated in the Introduction, are given in an Appendix.

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" ramification of the spadix, each ramification ending in *two* or *three* cylin-
" dric, having aments' or catkins 'most beautifully imbricated with innum-
" erable scales." The above, by Roxburgh, can scarcely be equalled in conciseness and clearness.—In most male spadices examined by the writer, however, he must say (and with all due deference to the statements of Rumphius, who says *two* is the most general number,) that the deviations from the *ternary* system, alluded to elsewhere, are rare indeed in our Ceylon trees.—The lower and shorter ramifications of the spadix are universally composed of three Aments or Catkins spreading from each other in the same plant, and distant from each other at the points aboutt 3 to 5 inches, the middle one extending from 2 to 3 inches beyond the other two.—One or two of the higher ramifications of the spadix are however sometimes divided into only 2 aments and occasionally consist of only one. These aments are from 12 to 15 inches long while the lower ones are only 9 to 12 inches in length.—The former being the older, or the first that protruded from the sheath, are, (by a wise provision of nature to keep up a succession of flowers,) the first to produce them, the lower ones blowing in succession downwards.—The *scales* of the ament are 'broad, wedge-formed, retuse, adhering by their lateral 'margins to the keel or back of the next above, (when the ament stands 'erect), forming a cavity for a fasciole of about 10 to 12 small,sessile flow-'ers; seldom more than one expand at a time, beginning with the upper-'most, so that there is a long succession of them.'—ROXBURGH. To the above equally clear and concise description may be added, that the flowers in these fascicles are arranged in two vertical opposite rows, beautifully serrated into each other, each fascicle forming an arch with its convex side undermost, the common receptacle of the little florets forming the other. These flowers appear in parallel nearly straight rows, running from bottom to top, or in parrallel oblique rows running from right to left, or from left to right round the ament, according to the position from which they are viewed.—There are hundreds of persons who would not even distinguish the expanded florets from simple dust or down, and perhaps it might be only one in a hundred of professed Botanists, who would, like Roxburgh, observe, that instead of one, each cell contained 10 to 12 flowers, only one being generally seen at a time, and the others coming out in succession in the little puncture occupied by that last blown.

Bracts, or chaffy-like leaves, 'numerous, wedge-formed, surrounding the bundle of flowers' but concealed within the scales of the ament.

Calyx proper, three sepalled, sepals 'wedge-form, concave, and like the bracts are hid within the scales of the ament.'

'*Corol*, elevated from the calyx on a small clubbed triangular pedicle, which is of sufficient length to raise the flower above the scales.'

Petals three, oval, concave, points incurvate, spreading.

Stamens six. '*Filaments* six very short. *Anthers* linear.'

It seems surprising that the generally accurate Rumphius, after giving

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the proper number of Petals, with their shape which he calls "*spoon-like*", should fall into the error of drawing all the little flowers on his male aments with 5 Petals, and stating that they have 5 stamens. These are shown again as being much longer than they ought to be, but still his drawing upon the whole gives one a fair idea of the male infloresecence. The odour of the male flowers is, as Rumphius states, somewhat pleasant. Every male Palmyra tree contains on an average from 630,000 to 650,000 complete flowers, thus:—Each upright row of flower cells already mentioned, contains about 50 cells; each ament has about 15 of these rows on its circumference, each ament having thus about 750 cells. These, taking the number of flowers they contain at 10, will give 7,500 in each ament. There are about 12 of those single aments in a compound spadix, thus giving 90,000 flowers in each spadix. Each tree has, on an average, 7 of these spadices, thus giving 630,000 flowers for each male Palmyra tree, as above stated; being, perhaps, the greatest number produced by any known tree.—"A single spathe of the Date contains 12,000 male flowers. The *Alfonsia amygdalina* has been computed to have 207,000 in a spathe, or 600,000 upon a single individual, and the *Seje Palm* of the Oronoco bears 8,000 fruits". See Lindley's Nat. Sys. of Botany, P. 343, Ed. of 1836.

THE FEMALE TREE.

Flowers. It is somewhat difficult to describe the flowers of this tree, or to say at what period any apparent difference between them and the fruits can be observed. I have examined these, as well as those of the Cocoanut tree, at various stages before and after the bursting of the spathes, and before the germs or little fruits had come out of the scales, but found the fruits in appearance much the same in all the stages. In the Palmyra they are so closely enveloped by the scales of the calyx or corolla, or both together, that I do not believe it is possible for the pollen from the Male Flowers to affect them until they gradually protrude from these scales. The various descriptions of the female flowers are very conflicting. They have no styles, but in all those examined by me they appear to have "in a scaly Navel as in the ficus", 6 sessile stigmas, or 3, deeply 2 cleft. From these 3, (not 4, as Roxburgh states) small striæ run, each ending in a dark-brown colored speck. If this part is sliced from off the top of the fruit, 3 equidistant dark spots will be seen, communicating in some way no doubt with the interior of the germs, to which they carry the pollen of the male flowers; and also other three in the centre, which latter, near the top of the fruit, touch each other and point outwards to the spaces between the former three dots.—Those in the centre diverge from each other towards the middle of the fruit, and, again, the 2 sets unite near the bottom, where they become confused.—From the three outer dots small tubes seem to pass horizontally into the 3 nuts.—With the exception of this connection, the several specks pass right

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down from the summit thro' the fibrous part to where the fruit is attached to the spadix. Near this, in half grown fruits, they form a hollow tube. All these particulars will be beautifully seen on cutting the fruit into thin slices. The stigmas, even thro' a magnifying glass, do not bear much resemblance to the stigmas of flowers generally; but there is no reason on this account to doubt that the flowers of the Female Palmyra are as fully developed as those of any other tree.—As already stated, these little fruits in their early stage are completely enveloped in closely and beautifully imbricated scales, sometimes overlapping each other from right to left and vice versa, and often confused. These enlarge with the fruit, until they split and form simply a cup or receptable for the ripe ones, when the scales appear withered and in some degree separated from each other.—Some writers who have described these, separate the calyx from the corolla, but I cannot perceive any difference in them. The lower end of the spadix is a smooth stem, but where the fruits are attached to it, it becomes enveloped in scales which cover all parts of it and rise over the fruits to the number of 8 to 12.—A barren scale encircles the spadix, just below where the fruits commence to rise from it, and the upper end of the spadix, extending to a length of 2 or 3 inches beyond the fruits, is also composed of these scales.—All the fruits that fall before they are ripe carry invariably 6 of these scales with them, and if those are removed, a small, and delicately constructed ring will be seen round the bottom of the fruit and lying flat upon it. This ring contains 6 equi-distant, monadelphous and barren stamens. Roxburgh and others say, "sometimes more or less"; but I should think the variation occurs very seldom indeed; for, as already noticed, the ternary system is complete in this palm in almost every respect.—The Drawing of the fruit in the Penny Cyclopædia, showing the barren stamens, is not a true representation, for in all those I have examined, the lower end of the fruit must be turned nearly directly towards the observer before these can be seen.

The spadix bearing the fruits is generally simple, and covered with a single sheath, or spathe as in the Areca, *(A. catechu)* or Cocoanut trees, but it is sometimes compound, and bearing two bunches of fruit in a compound spathe.—The fruits are, with beautiful regularity, arranged round the spadix in three rows, and, whichever way examined, are found in nearly opposite pairs.—Each spadix bears from 10 to 20 fruits, and one of these spadices, with the fruits ripe, would be nearly as much as a man could carry.—Each tree bears 7 or 8 of these spadices, so that a tree often bears about 150 fruits in one season: each fruit is about the size of a young child's head.—The fruits when young are pretty distinctly three cornered; but, when old, the pulp round the nuts so swells as to give the fruit the appearance of a perfect globe.—Each fruit contains generally 3 nuts, and notwithstanding what Roxburgh

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states about there being sometimes 4, I never saw more than 3.—Three is the uniform number, but very often one or two are abortive; and this circumstance, if the statements of Natives can be depended on, is important, as enabling us to foretell the sexes of the future trees; which cannot otherwise, until they begin to bear, be distinguished by the most acute Botanist, or Native cultivator of them. If, it is said, there should be but one fully formed nut in a ripe fruit, the tree from it will be a *male;* if 2 nuts, one will be a *male* and the other a *female;* if 3, then, all will be *females.*

The ripe fruits or drupes contain 1, 2, or 3 Nuts, embedded in a mass of soft yellow pulp, *(See Poonato,)* intermixed with dark straw colored fibre or coir.—These nuts are oblong and a good deal flattened, and covered with a mass of short fibre which adheres to them. Besides this fibre they are covered with a thick shell, so difficult of fracture that the Tamils say an Elephant cannot break it. I have tried to break one of them with a heavy hammer, but the experiment is a dangerous one, the fruit flying off when struck with a force sufficient to break a man's shins. When for some time in the ground, however, the shell becomes softer and the kernel expands; in this state the nuts are frequently cut across with an axe, and the kernel eaten.—This kernel, when the nut is broken before it begins to germinate, nearly fills the interior, looks like that of the Cocoanut, with a more silvery tinge, is about $\frac{3}{8}$ to $\frac{1}{2}$ of an inch thick, and nearly as hard and tough as white horn, which it much resembles.—When the nuts begin to germinate, the space within the kernel, or that which in the Cocoanut contains the milk, fills up with a cream colored substance of the consistence of cheese.—From this the *Root* of the germ or young plant protrudes, thro' that end of the nut which was attached to the spadix, the body or actual stem of the plant following, until the two first leaflets are thrown up with the shell of the nut attached.—All these parts are, when very young, beautifully incased in an entire leathery substance like the sheaths of the inflorescence.

The *Odeals* (ஒடியல்) that are brought in such quantities from Jaffna for the Colombo Bazaars, are left in these cases, and are protected thereby from mould &c. There is great confusion about these *Kelingoos* (கிளங்குகள்) or *roots* as they are called by the Tamils, for they are in fact the entire young Palmyra tree. Each of these little trees has 1, 2, 3, or 4 rootlets attached to it.—The lower part of the stem where those roots are attached resembles much that end of a Carrot, Parsnip or Radish to which the crop is attached; and indeed the plant altogether looks very like an inverted long Parsnip.—These Kelingoos, which are formed beneath the surface, are about 1 inch thick at the lower part, and taper off to a mere point at top, being 12 to 15 inches long, and having a slit or groove running from

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near the bottom to the top. This groove is the mere folding inwards of the first leaf, which composes nearly the entire thickness of the stem, for if it be cut across, it will be found to enclose the inner leaves in a small oval pipe about ⅛ of an inch in thickness. On a section being made, this little pipe can be pulled out, leaving a beautiful smooth hollow.—When these *Kelingoos* are about 9 to 12 months old, they have generally two leaves just issuing from the surface. These are from 1 to 1½ inch in breadth, and from 2½ to 3 feet in length, having only 4 or 5 folds in each leaf. The Plants when in this stage are so like a species of Orchis growing throughout Ceylon that the two are frequently confounded. When the leaves issue from the ground no part of the stem is seen, but a succession of leaves goes on, increasing in breadth and thickness, for 6 to 7 years. The stem close to the ground is then perhaps as stout as ever it will be; indeed in many cases stouter, as the trees harden and compress by age. It is this appearance of the young tree which misled the American traveller, Malcolm, into supposing that the tree issues from the ground the full thickness which it is ever to attain.

Leaves.—These, on trees in the Jungle or at a distance from human habitations, will be found in their natural wildness and luxuriance, extending from bottom to top, until the tree attains a height of 25 to 40 feet, the lower or older ones displaying their stems *(Petioles)* only, the web or fan part having rotted away. A tree thus armed with the silicious and serrated edges of the stems of its leaves, which will be described hereafter, is a formidable object to come in contact with, as persons who like the writer have had to ride through groves of them will readily admit. The Tamil Proverb says:—"What he saw was a snake, but what bit him was a Palmyra Leaf." The leaves grow on the tree in three separate spiral rows, beautifully ascending from right to left in some, and from left to right in others. When the writer first noted this arrangement of the leaves he had hopes thereby of being able to distinguish the sexes, but was disappointed—males and females indifferently having these 3 rows of leaves ascending in right or left screws.—The lower end of each leaf splits and clasps about ⅓d the circumference of the tree; and those claspings of the leaves are so woven into each other, that a leaf is with difficulty torn from a young tree, and never without loosening some of those that overlap parts of it.

The stem of the leaf is 3 to 4 feet long, tapering from the bottom to the top where the fan part commences.—It is deeply concave or grooved on the upper side, and equally convex or rounded on the under side.—The fan part has 70 to 80 rays diverging from the end of the stalk in nearly an entire circle, but not able from the breadth of the leaf to spread horizontally, thus giving a section of the leaf a

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serpentine form. Besides 5 or 6 of those larger enfoldings, each ray is a good deal plaited like a lady's fan.—Each leaf embraces about 160 of the slips used for letters &c.—With due deference to Mr. Cryer's "Pair of annual leaves", (See Appendix,) each tree has from 25 to 40 fresh green leaves on it at a time, and of these the natives frequently cut off 12 to 15 annually, or a greater number once in two years, to be used for various purposes, as well as to enable the fruits to ripen and increase in size.—With this latter end in view the larger trees are generally denuded of their leaves at the season when the fruits have attained to a considerable size—early in July at Jaffna. No trees are better adapted for sheltering birds and animals, and hence they are resorted to by birds at night, and by Rats, Squirrels, Mungooses, Monkeys, Maranayas (Tree Dogs), &c. during the day time.—When a tree has its old leaves undisturbed, the number of Bats sometimes occupying it is incredibly great. The grooves in the stems, and the whole construction of the leaf is beautifully adapted for conveying the rain, and every thing that falls on them towards the trunk of the tree, giving nourishment, especially on trees in a wild or unpruned state, to about 100 different species of parasitical and other plants that grow on the Palmyra Palm.—Of these several species of tall slender *Phylanthus*, of *Morinda*, *Convolvulus*, *Orchis*, and *Ficus*, may be mentioned as growing on and around the Palmyra trees in Jaffna.—There is a species of *Orchis* called *Parang Catâlé* which often encircles the Palmyra trees at various heights from the ground, displaying beautiful tassels of pink colored flowers. A fine Plant can be seen at Mutwal near Colombo in the Garden of Belechor Perera Modliar; where there is also a very beautiful specimen of a natural curiosity which we now proceed to notice.

The most generally conspicuous and interesting union is that formed by the Palmyra and 10 or 12 species of Ficus, which grow on it, both in Colombo and Jaffna. These include the Bo-GAHA (*Ficus religiosa*), the GAN-ATTIKA (*F. glomeratus*) or true *Sycamore* tree of the Bible, &c. &c. which all appear somewhat strange and fantastic; but by far the most remarkable of these is the union formed by the Palmyra tree and *Ficus Indica*, the true *Banyan* tree of the English and *Nuga-gaha* of the Singhalese; although Moon has confounded it with the *F. Benghalensis* or *Kiri-pælla* of the Singhalese, and Roxburgh with *Bogha* (? Bo-gaha). The latter author in his turn has misled the writer in the Penny Cyclopædia. The Rev. Mr. Cryer, in the Youth's Instructor for 1836, gives a pretty correct Drawing and description of this Phenomenon. The Wood-cuts from Drawings by Mr. C. A. Lorensz of Colombo and Mr. J. Koch of Jaffna, engraved by Mr. Juan De Zilva, and introduced into the present description, are excellent representations of many of these united trees as found in Jaffna and India, and the origin of which is so well described by

UNION OF BANYAN AND PALMYRAS NEAR JAFFNA.

Roxburgh. When the fruits of the Banyan are ripe, all sorts of Birds flock to eat them, and these when they alight on the Palmyra trees during the day or roost in them at night, "drop the seeds in the "alœ of the leaves, where they grow and extend their roots &c. so "as in time to embrace the parent Palmyra, except its upper parts. "In very old ones the top thereof is just seen issuing from the trunk "of the Banyan, as if it grew from thence, whereas it runs down "thro' its centre, and has its roots in the ground, the Palm being "the older. For such the Hindoos entertain a religious veneration, "saying it is a holy marriage instituted by Providence." ROXBURGH. Trees of this kind are occasionally seen at Batticaloa, and are plentiful in Jaffna and Southern India. In surveys carried on by the writer in the Northern Peninsula, they used to form very conspicuous marks for connecting plans.—There is especially one remarkable specimen of a Banyan having 2 or 3 Palmyra trees growing in it, at a place called Kaythady, 4 or 5 miles from Jaffna, on the right hand side of the road to Chavagacherry. It covers 1 1/12 Acre of ground, and doubtless began its existence in the leaves of one of those Palmyra trees whose coronets now surmount its green foliage and thousand light and graceful stems. This is perhaps the largest Banyan Tree in Ceylon, and naturally forms a favorite resort for pleasure parties from Jaffna. On one occasion I cut a rootlet from this tree, which, having descended from one of the topmost boughs and fixed itself in the earth below, was rapidly thickening into a stem. It was just half an inch in diameter throughout and nearly 50 feet long. When cut it proved so elastic as to admit of being easily coiled up into a very small compass.

NOTE BY THE EDITOR.

[The Banyan appears to be so intimately connected with the subject of this little work, that I take the opportunity of introducing here a representation of one sketched in the neighbourhood of Colombo, by that accomplished artist A. Nicholl, Esq. A.R.H.A., who presented it to me on his departure from Ceylon. The task of cutting has been performed by the same ingenious Native who has executed the other illustrations of this *brochure*, and whose patience and skill exercised on details so minute and delicate as those here traced, have produced an engraving, which will, I trust, be received with a double degree of favour, as a proof of the advance which a very interesting and useful art has made in Ceylon, and as a faithful portraiture of one of the most solemnly beautiful of Nature's productions;—an object so eminently calculated to excite in the mind of the beholder the emotions described by the Poet in the lines quoted below]:—

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SYNONYMS.

The various names given to this tree, even by Englishmen in descriptions of the several regions in which it is indigneous, are very puzzling. The difference in the names of this tree as well as of others in the several articles in the Penny Cyclopædia, indicate the productions of writers differing in their degrees of information. Some of them have confounded this Palm with the *Gomutus Gomuti* or *Saguerus Rumphii*, a very different tree indeed, and which although by Roxburgh called *Borassus Gomutus*, belongs to a different genus from the Borassus.—In the Bombay Presidency the Palmyra tree is known as the *Brab* tree, and on a recent Chart of the Madura coast and Paumben Passage by Captain Franklin, and on which numbers of Palmyras appear, are to be seen pretty frequently the words "*Brab tree*" "*Single Brab*."—*Point Palmyra* near Point Pedro, and *Point Palmyras* in Orissa below the mouths of the Ganges, have derived their names no doubt from the most familiar term by which this tree is now known. In Java, and other parts of the Eastern Archipelago, it is better known by the Malayan name "*Lontar*"—hence the allusions to the various products of the Lontar tree.—We append a

LIST OF SYNONYMS OF THE PALMYRA TREE, AND PARTS OF THE PALMYRA TREE.

Tala, Tal, Trinrajan	Sanscrit.—SIR W. JONES, &c.
Tal-gaha	Singhalese.
Panay-maram—The Palmyra Tree	Tamil, as spoken at Jaffna.
Arn-Panay—The Male	
Purn-Panay—The Female	
Vadaly—The Young Tree	
Oly—The Leaf	
Panang-kai—The Fruit	
Nonku—The Kernel	
Pootpady, Poottaly, Ponthy, and Talam	From the Thala Vilasam. Poetical Tamil.
Tatechuttu—The Palmyra Tree	Telingoo.
Potutadu—The Male	
Pentetadu—The Female	
Bonda—A Young Tree	
Tatikaya—The Fruit	
Tataku—The Leaf	
Nungu—The edible part in the fruit	
Tal	Bengalee, and Hisdostanee.
Lontar	Malayan. Indian Archipelago.
Lontar Lacki-lacki, Male	Do.
Lontarus Domestica	RUMPHIUS—Herb: Amboyna.

Am-Pana—The Male .... *Carim-Pana*—The Female	Rheede's Hortus Malabaricus.
Tala-wruxium	Tanjore—Rumph:
Taark-Dizuar	Deccan— Do.
Sualan	Java.
Coli.............................	Timor, &c.
Murume	Cochin Chinese.
Pannguera	Portuguese—Fox's Dict:
Palmeira macha brava	Do. Various authorities.
Palmyra, Palmeira, Palmaira, Palmayrah, and Palmirah	English.
Fan-palm	Do. Loudon.
Jager-Boom, Weingeevende-palm Boom.......................	Dutch.
Palmeer Boom	Do. Rumph:
Die Weinpalme	German. Do.
Facherformige	Do. Nom: Triv: Wild.
Le Rondier.......................	French—Loudon.

Geographical Distribution.

From what I have been able to collect on the subject, I think the Palmyra will be found one of the Palms having the greatest geographical distribution, if indeed it is not that having the widest, the Date Palm excepted.—Of the habits and Geographical distribution of Palms in general, Von Martius, the great illustrator of this noble family, thus writes:—"Palms, the splendid offspring of Tellus and "Phœbus, chiefly acknowledge as their native land those happy regions seated within the tropics, where the beams of the latter for ever "shine. Inhabitants of either world, they hardly range beyond 35° in "the southern, or 40° in the northern hemisphere. Particular species "scarcely extend beyond their own peculiar and contracted limits, on "which account there are few countries favorable for their production "in which some local and peculiar species are not found; the few that "are dispersed over many lands are chiefly Cocus nucifera, Acromonia "sclerocarpa, and Borassus flabelliformis. It is probable that the "number of species thus scattered over the face of nature will be found "to amount to 1000 or more.* Of these not a few love the humid "banks of rivulets and streams, others occupy the shores of the "ocean, and some ascend into alpine regions; some collect into dense "forests, others spring up singly or in clusters over the plains." Lindley's Natural System of Botany.—In "Johnson's Physical Atlas" where the names of the most remarkable plants are inserted,

* "At the present time, 44 years after my return from Mexico, there are from the old and new World, including the East Indian species brought by Griffith, about 440 regularly described species."—Humboldt's Aspects of Nature, 1849. [Ed:]

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"BORASSUS FLABELLIFORMIS", is written in a curve beginning on the North Eastern part of Arabia, in about 20° North Latitude, and 54° East Longitude, extending through the Indian Ocean and the Southern part of Hindostan ending in about 20° North and 73° East in the Bay of Bengal.—A gentleman long resident in the East and who has travelled through a great portion of it, states, that he saw this tree growing on both sides of the Persian Gulph. Immense numbers of this Palm are found on the Malabar Coast extending from Cape Comorin through Travancore, Calicut, Goa, and the Bombay presidency, on through Gujerat, and up some distance on the banks of the Indus in Scinde: but what are emphatically called the Palmyra regions may be included in a line extending along the Coromandel Coast from Cape Comorin to Madras, including the Northern portion of Ceylon, thus passing through Tinnevelly, Tanjore, Pondicherry, &c. &c., and from Madras all along, taking in a considerable belt of the Coast between that and Point Palmyras, and then passing up to Gya on the 85th degree of East Longitude and nearly 25° of North Latitude. After that the line should be carried on about due East till it reaches Ava, the Capital of Burmah, below which, on the banks of the Irrawady, there are immense groves of this Palm. From Ava the line should pass down nearly South thro' the Malayan Peninsula and the Indian Archipelago, including Sumatra, Java, Borneo, Celebes, Floris, Ceram, Amboyna the Molucca Isles, and, perhaps, the Island of New Guinea. The extent of their distribution in a South Easterly direction from Arabia in about 54° to New Guinea in about 140° East Longitude is about 86° degrees, or 5,160 Geographical Miles, thus including about ¼th the circumference of the earth.—From Crawfurd's Embassy to Ava, Malcom's Travels in Hindostan and Burmah, and various other sources, it will be found that this Palm extends to between the 25th and 30th degrees of North Latitude in various parts of Asia. I do not perceive that it is found in the Flora of the Mauritius, and I never could learn that it grows in Madagascar or in any part of Africa.*—The same observations apply to Australia and the Polynesian Islands, in which places tho' in the Palm Latitude, the number appears to be very limited.—The Palmyra tree is found in Timor in about 10° South Latitude, and this very likely will be found its utmost range Southwards.—I am not aware that the *Borassus flabelliformis* exists in South America, so that it may be concluded that very few Palmyras will be found out of the region within 10° South and 30° North, 54° and 140° East. The real Palm climate having however a mean annual temperature of 75° to 83° Fahreneit, and as

* While passing these sheets thro' the Press, the London PATRIOT Newspaper brings me the Rev. Mr Livingstone's account of the discovery of the great Inland Lake, supposed to be situated in about 20° 20' South Lat: and about 20° East Long:—Talking of the natural features of the country, the writer says:—"The Banyan and Palmyra Trees give in some parts an Indian cast to the scenery." [ED:]

the Palmyra is found in various parts of the Mountain Districts of Ceylon, including the vicinity of Kandy and of Badulla at elevations of 1,680 and 2,450 feet respectively, and having mean annual temperatures of about 74° at the former, and by calculation of the difference in altitude, a mean annual temperature of 71½° at the latter, and in other countries perhaps at higher elevations and in lower temperatures; there is no reason why the Palmyra tree should not grow in favorable situations along the Sea Coast in a much higher Latitude than 30° North.

Although as already stated immense groves are found on the banks of the Irrawady, from the Sea Coast up to nearly as far as Ava or Amarapoora in Burmah, and as far Inland as Gya in Bengal, and in isolated patches all round and through Ceylon, still the most congenial places for their favorable developement will be found in low sandy plains scarcely elevated above the level of the Sea, and where they are exposed to the burning sun, and the force of at least one of the Monsoons.—Such are Jaffna, with the surrounding Islands, and other portions of the Northern Province of Ceylon,—the District of Tinnevelly, with portions of the Madura Collectorate, portions of the Madras and Bombay Presidencies, and of the Indian Archipelago.

This Palm appears to have been introduced into England in 1771.

Value of the Palmyra to the Inhabitants of Jaffna, and other parts of India.

It is not exactly the wholesomeness or nourishing qualities of the edible products of the Palmyra tree that make it so important to the inhabitants of India; but simply the fact, that thousands, perhaps millions of the people can procure these from their own Palmyra groves, or purchase them at a low rate from their neighbours; whilst Rice and other articles of food, are frequently so expensive as to be placed beyond their means. The Palmyra tree is, in this respect, what the Potato has so long been to the poor Irish and Scotch. In 1845 when Fever prevailed to a fearful extent in the Patchelapalle District of Jaffna, the writer found that those of his Coolies who lived chiefly on Punatoo were the first to get Fever, those living upon Rice and Curry holding out the longest. This fact seems only in accordance with the testimony of almost universal experience, that a generous (not stimulative) diet, is the best preventive of disease, and the best preparation for enabling the human frame to grapple with sickness when it comes.—Libieg has a passage which accounts to a great extent for the feeble resistance offered by oriental frames to Cholera and other violent epidemics. He writes:—" All plants of tropical regions, " such as the sugar-cane, the palms bearing wax and oil, contain, in " comparison with our own cultivated plants, only a small quantity " of the constituents of blood necessary for the nourishment of ani-

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"mals." In the course of inquiries respecting the general use of Punatoo as the food of the people in certain districts, it was learned, that Rice was such a scarce commodity that, "I gave him *even* Rice Cunjee (gruel or water in which Rice has been boiled), and he died"! is an expression often used with reference to the victims of fever or other diseases. Still, we have to do with the great fact, that at this moment Palms and their Produce constitute the support of a large proportion of the inhabitants of the tropics. The individual Palm of which we treat yields perhaps one fourth part of the food of about 250,000 inhabitants of the Northern Province of Ceylon; while it no doubt forms the chief support of about 6 or 7 Millions of the inhabitants of India and other parts of Asia; thus proving itself to be one of the most important trees on the earth—rivalling the Date Palm and ranking only below the Cocoanut.

Products of the Palmyra Tree.

In enumerating the various products of the tree it would be difficult to mention any part that is not of great importance to the inhabitants of the countries where it grows.—*Roots.* These, if the proper roots be understood, are perhaps the only parts that are not applied to any use with which the writer is acquainted.—A Native informant states, however, that the sap of the roots and trunk, after they have been bruised with a stone, is used to cure sores created by the "falling of spittle," and also Dysentery.—*Trunk.* There is no wood better known in Ceylon and in the Maritime parts of India than the Palmyra wood, which Roxburgh describes as being, for Rafters, "decidedly the first wood in India."—Large quantities of this timber are exported from Point Pedro and other parts of Jaffna to Madras and Colombo.—At certain seasons of the year the felling, splitting, dressing, and exporting of it, give work to thousands of the Tamil people of the Northern Peninsula.—After being prepared where they are felled, the Palmyra Rafters are carried to Point Pedro from various parts of the neighbourhood, chiefly on the heads of women, who indeed seem in many cases to be the creatures of burthen in Ceylon. The Rafters are then sent out to the Dhonies or country vessels in rafts, and are taken to Negapatam, Nagoor, Cuddalore, Tranquebar, Pondicherry, Madras, and elsewhere on the Coromandal Coast, in exchange for Grain, Cotton Cloth, Metals, &c.*—Elsewhere are tables of the exports of this timber and other products of the Tree from Point Pedro and other Ports in the Northern Province for a series of years.

* Occasionally large piles of Palmyra Timber are heaped along the shore at Point Pedro ready for shipment. This, it is said, was the case when the British Fleet appeared off the Coast in 1795, and the story afloat amongst the Dutch Descendants, to the effect that the piles of Palmyra Timber were in the first instance mistaken for batteries, is by no means improbable.—Ed.

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The trees require to arrive at a considerable age before they are of use as timber. When the trees reach the age of 100 years they are very good; but it is well known that the older they are the harder and blacker does the wood get, hardening and getting thicker from the outside towards the heart of the tree, as in other palms. Also from the bottom to the top, (a large portion of the latter being too soft for timber purposes;) thus beautifully illustrating the mode of the growth of Palms, being the prolongation of the leaves which have fallen off. Although it is somewhere stated that Endogenous plants die from the above process going on until the centre is so hard that the sap cannot circulate, yet I have never heard of a Palmyra tree dying of old age.—There are doubtless many houses in Ceylon which have rafters in them that have stood for 100 years. In many old Dutch Houses when they are repaired, the rafters are observed to be, if any thing improved by age.—Large quantities of Palmyra timber are always for sale in Colombo, and there are very few of the tiled houses and stores that have not the rafters and reepers, (laths,) made of this durable timber.—Its specific gravity according to Mr. Mendis, the Master Carpenter Royal Engineer's Department, is 65 lbs. per solid food. Good old solid trees are used as pillars and posts for the Verandahs &c. of houses.—The Well-Sweeps so universally used in nearly all the wells in Jaffna, for raising water for the irrigation of the fields and gardens, and for other purposes, are made of Palmyra rafters, and are constructed and used as follows—Two rafters are secured by laying the inner or flat sides together, leaving the bottom parts as stout and heavy as the wood will admit of, to act as a lever. About 6 or 7 feet from this end, a hole is cut, in which a piece of wood 3 or 4 feet long is placed as an axle for the lever to turn upon; from this to the lower end several sticks are passed through to be used as a ladder by 2 or 3 boys, who are employed to climb up and down when much water is required to be drawn. The other end of the sweep is about 15 feet long, and a rope is attached to it on which a woen basket made of the Palmyra leaf is fastened, having sometimes a stone hanging down in the middle and at others on the side, to make the basket sink. When the wells are not deep, sticks are used instead of ropes. In this case, of course, no stone is required to make the water basket sink. One man attends to the water basket and empties the water into a trough or spout made of the Palmyra tree, and another directs it into the drains and channels made thro' the field which is to be irrigated; while the boys, when the basket is sent down, run up on the lever towards the axle until the basket is full, and then they run back, thus acting as a powerful aid to the lever in bringing the water up.—These levers are often supported about 8 feet from the ground between two Palmyra posts, when the well is not used all the year round; but live and permanent ones are, at

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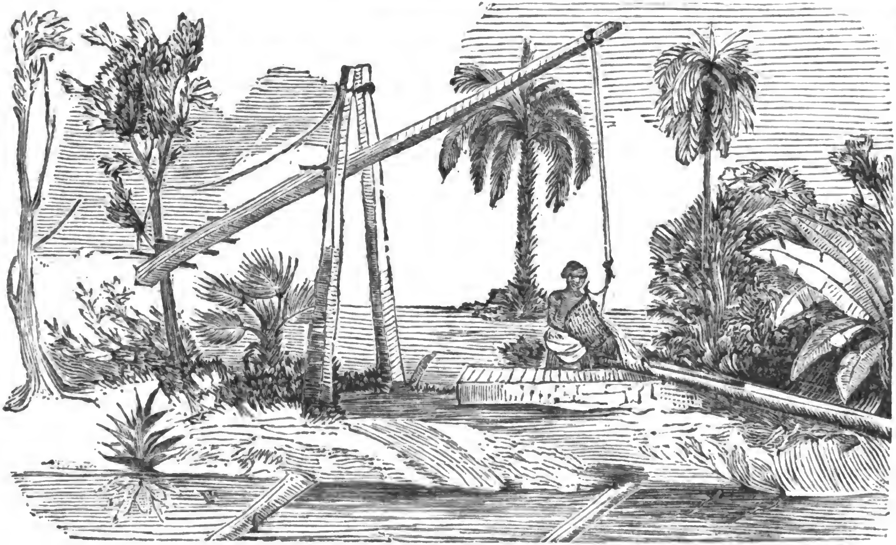

WELL SWEEP.

Drawn by Mr. L. Nell, Engraved by Mr. J. De Silva.

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those wells much used, put into the ground. The tree generally chosen for this purpose is the ***Erythsina indica,*** "***Murukoo***" of the Tamils, and ***Wœta-erabodu*** of the Singhalese. Posts of this tree take root at once, and would soon grow inconveniently large and umbrageous, but are cut to prevent this.—Another tree, the ***Othe-maram*** of the Tamils, tho' condemned in a Tamil Proverb as useless, is chosen for this purpose; it is the ***Odina Wodier***, and grows as easily at the others. Generally speaking the ***Murukoo*** is grown beside Wells in the neighbourhood of dwellings; while for Field Wells, the ***Poverasy, (Hibiscus Populneus,)*** is preferred, on account of its deeper shade.—Wells such as I have attempted to describe, are now becoming common in the neighbourhood of Colombo, and the Engraving, (from a Drawing with which I have been favoured by Mr. L. Nell,) will serve to give a very correct idea of the apparatus by which large quantities of water are rapidly raised. In the calm clear evenings a very lively and animated aspect is given to the generally monotonous plains of Jaffna, by the appearance of hundreds of these Well Sweeps being worked simultaneously and in all directions, to raise those supplies of lime-impregnated water, on which the fertility of the naturally arid but most exquisitely cultivated soil so much depends.—The accomplished authoress of "Sketches in Southern India" very naturally recognized in this mode of irrigation, as pursued at Madras, an illustration of Deut. XI, 10. "Where thou sowedst thy seed and wateredst it ***with thy foot***, as a garden of herbs." I quote here a beautiful passage which is quite as applicable to Jaffna as to Madras.—"I ought to have told you, that the whole garden is divided into beds and borders by small shallow channels, and thro' these the water is conveyed over the whole garden by a third man who guides it aright by opening or closing a passage for it with his "foot." The gardens are watered in this manner every evening; and the soft and pleasant song of the gardener, as he fearlessly paces up and down in his insecure position, is doubly welcome, at the end of a sultry day, when borne on the evening breeze, it tells you, you may now throw open your doors and windows without fear of a scorching blast."

There appears to be some superstitious notion afloat at Jaffna in connection with the mode in which the Well Sweeps are hung, and the direction to which they point. On one occasion at Point Pedro a serious quarrel ending in a law-suit was occasioned by the hanging of a well sweep so that it pointed to a certain house; and fever, which shortly afterwards attacked the inmates, was traced to the same cause. The Astrologer is, I believe, generally consulted on this subject, as on most others.

In the sandy parts of Jaffna where water is found near the surface and where, from the strong winds and other causes, the wells are liable to be filled up, a hollowed part of a Palmyra tree is inserted,

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and this forms a well from which the thirsty traveller is often refreshed. Many, who like the writer have travelled in the heat of the day between Klaly and Chavagacherry, in the Peninsula of Jaffna, have found a well of this kind which is close to the Salt Lake, and surrounded by a grove of the Screw Pines, (*Pandarus odoratissimus*), a welcome friend.—Palmyra trees split into halves and with the hearts scooped out are used as spouts for various purposes, but more especially for carrying away the water from the eaves of houses. The thick parts of trees are generally taken for Rafters, the thinner portions or tops for Reepers.—The trunks of young trees or the top parts of old trees are often cut up into pieces, split and placed where game is plentiful in the Patchelepalla district of Jaffna. The wild hogs and hares are very fond of the soft, white, spongy hearts of the logs, and, in resorting to them to eat them, are frequently shot by the Natives.—The dark outside wood of very old trees, when turned or otherwise worked, is an excellent fancy wood, and used to some extent in England.—Umbrella-handles, Canes, Rulers, Boxes, Wafer Stamps, &c. are made of this wood.—The workman operating on this wood has to be very careful however, as when split some of the wiry fibres get loose and are very apt to run under the nails of the fingers, or into the hand, and are very painful.—It is stated that the side of the tree exposed to the South winds is the thickest, hardest, and best.—The Natives if they are not quite certain of the age or quality of trees to be felled, often cut a notch into the trunks near the ground to see how far the black wood extends.—This is not an infallible method of finding out the worth of a timber tree, for tho' generally the test holds good, the trees on being felled are sometimes found useless a little above the cut, the hard wood sometimes, too, commences 3 or 4 feet above ground.—As wounds thus made are not likely to heal as in Exogenous plants, they cause no doubt some injury to the tree.—From these wounds, frequently, a large quantity of sap runs, which, it is to be hoped will not be confounded with the Toddy from the spathas.—The sap from the wounds forms a slimy useless jelly on the tree, but the idea, if entertained, that this is the Bdellium so often alluded to as being procured from the Palmyra Palm, is as preposterous as would be the supposition that the Catechu of commerce is procured from the *Areca catechu*.—It is a sad mistake to suppose that these trees produce any such gums, and the error about the Palmyra tree producing Bdellium, so often repeated on the authority of Rumphius, is to me unaccountable; for in no part of his description, which has been translated for this pamphlet, is there a word about Bdellium. How, therefore, Rumphius is on this head quoted by Ainslie and others, is to me a mystery. In a Supplement to the London Pharmacopæia published last year, this mistake is repeated, and it also occurs in so respectable a work as the Penny Cyclopædia—But to return to the timber, it is well known

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in Ceylon that the female tree produces the best and hardest, and that the timber of the male tree, notwithstanding Rumphius' statement to the contrary, is considered so inferior that it is seldom used unless the trees are very old.—A hint on this subject may not be useless to buyers or sellers of Palmyra Rafters:—The blackest and heaviest should be chosen; but, as many of the Natives in Jaffna add weight and color to the white Rafters of young trees and males, by steeping them in salt water, this rule may not hold good; in that case an adze or axe should be used, and if the timber is good it is very hard and flies away in chips, displaying the ends of the dark wiry fibres thickly packed together; but if bad, and wood that has undergone the "salt water cure", it will be found soft and spongy, with the fibres far apart, and the other parts composed of fecula or farina like sago.—This timber splits so freely that great caution must be used in driving nails into it.—Most people writing about the Palms of India allude to their multiform uses, and state that boats, sails, &c. are made of them; this may be true in regard to some* but Boats or Rafts made *solely* of Palmyra timber would be too heavy to float with a cargo.—The Rails or Bulwarks, and the Roofs or Decks of the Dhonies are made of Palmyra Rafters, but the vessels themselves are never built exclusively of Palmyra wood.

In Jaffna where Palmyra Trees are plentiful they sell at from 3s to 6s each. A single tree will yield from 3 to 5 Rafters; cut entirely into Reepers, the number is generally 15. A good idea of the value of prepared Timber at Jaffna, and what would be a fair price in Colombo, may be formed from the subjoined Memorandum, with which I have been furnished, shewing the valuation put on Timber of various lengths being of ordinary quality. As there are no duties coastwise, 25 per cent. added to the Jaffna valuation and the cost of freight, would probably shew the averagee price which should be paid in Colombo.

No. of Rafters.	Cubits in length.	Value in Jaffna.	Value in Colombo.	Freight from Jaffna to Colombo.
100......	... 8 ...	£2 10 0	£ 4 0 0	£ 1 0 0
Do......	... 10 ...	3 15 0	6 0 0	1 10 0
Do......	... 12 ...	6 0 0	9 0 0	2 0 0
Do......	... 14 ...	8 0 0	12 0 0	2 12 0
Do......	... 16 ...	12 5 0	17 10 0	3 15 0
Reepers.				
100......	... 8 ...	£0 9 0	£ 0 15 0	£ 0 4 0

*Canoes are, in Bengal, I believe, frequently formed from a single hollowed Date Tree.

RIPE FRUITS.

The Fruits ripen in the months of August and September, and although there are not many trees in the neighbourhood of Colombo, still, some of the fruits are sold in the Bazaars. These fruits, when ripe, vary in color from a light gold at the end attached to the spadix, to brown and nearly black at the other. Some trees have all their fruits of a beautiful gold and others of a very dark color,* and these differences in their colour and other properties have induced the Natives to give them various names. On this subject an intelligent Native has furnished the following Memorandum:—

"Palmyra Trees are named from the color, smell, taste, &c. of the fruits and from several other causes.

1—FROM COLOR.

தொரைச்சி—Thoratchy—Color compound of white and yellow.
கருப்பச்சி—Carooppachy—Black.
தொரைக்கருப்பை—Thoricarooppy—Black greater part, with white & [yellow.
கருப்பைத்தொரை—Carooppythory—White and yellow greater part, [with black.
நரிக்காச்சி—Narycatchy—Color of a Jackal.
வெள்ளைக்காச்சி—Vellycatchy—White.

2—SMELL.

பூனரி—Poonary—Smell of a flower.
கிளுவங்காச்சி—Keluvangcatchy—Smell of Keluvy (Hedge Shrub.)
கற்பூரவடலி—Katpooravadaly—Smell of Camphor.

3—TASTE.

தேனி—Thēny—Honey.
காரிச்சி—Caritchy—Bitter and sour.
மாம்பளச்சாரி—Mampalachary—Mango fruit juice.
கரும்பி—Carumpy—Sugar-cane.

4—FORM.

வாழைக்காச்சி—Valycatchy—Plantain.
மூடாக்காச்சி—Moodācatchy—Large, like a pot.
கூடவன்காச்சி—Coodavancatchy—Bent or crooked.
வட்டக்காச்சி—Vattacatchy—Round.

* Van Rheede's names for the Palmyra tree are no doubt Tamil ones, and corruptions of the Male tree Aan or Aru-Panay, and CARIM-PANA the Black Palmyra.

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The fruits when they fall ripe from the tree, are sometimes eaten raw, but are more generally roasted, and the scene exhibited at a roasting feast of Palmyra fruits, is in the writer's estimation one of the most purely Oriental that can be witnessed.

When at hand, the shade of an Illipe, *(Bassia longifolia)*, of a Margosa, *(Melia Azadirachta)*, or Tamarind *(Tamarindus Indicus)* is chosen; a fire is lighted on the ground, composed of Palmyra leaves &c. and the party, Men, Women, Boys and Girls, squat around, sucking the pulp out of the fibres of each fruit as it is roasted, tearing them asunder with nails and teeth in the most approved and natural style, all appearing wrapped in the highest possible state of alimentive enjoyment.—This jelly or pulp resembles mashed Carrots, but is a little darker.—From Sir Robert Schomburgk's description of the Ita Palm *(Mauritia flexuosa)* of Guiana, it appears that its fruits and the uses to which they are applied by the Indians, are, in many respects, very similar to those of the Palmyra fruits, as will appear from the following extracts;—

(From Sir R. H. Schomburgk's Description of the *Murichi*, or *Ita* Palm of Guiana.)

"The fruits, after having reached maturity drop on the ground. The fibrous flesh which surrounds the seed is in the commencement hard and not eatable. After a few days, chiefly if they have been lying in the water, the flesh assumes a yellowish colour; the scales which cover the fruit are now easily removed, or drop off and the flesh has become mellow. I have already observed that the Mauritia grows generally in swampy soil, or on the banks of rivulets; they drop therefore at once in the water, and if the Palm should be in the neighbourhood of an Indian Settlement, the inhabitants resort there daily to collect such as are mellow. But otherwise whole basketsful are carried to their home and there immersed in water. The taste is peculiar and they are by no means relished by Europeans who taste them for the first time. We accustomed ourselves however soon to their taste, and followed frequently the example of our Indian Guides of eating them with our Cassada Bread. It is a remarkable circumstance that when necessity obliged us to use them frequently, we found that our linnen, after perspiration assumed a yellow color. The Indians make likewise a refreshing beverage from its yellow flesh, by merely pressing it and mixing it with water. However, when we commenced our journeys, and they thought we might not meet on our way with any Murichi Palms, a large number of fruits were a day previous to our departure collected, the flesh peeled off and stamped into a mass, which was pressed firmly into a Basket. If they felt thirsty, the Indians took a small quantity and mixed it with water; or if hungry at the same time, some Cassada

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Bread was mixed with it, and apparently it quenched now their thirst and satisfied their appetite. As it commences to go over into fermentation already after having been 24 hours in the basket, it is apt to intoxicate when drunk in large quantities.

* * * * *

At a certain period of the year the trunk is tapped, and a fluid flows from it which possesses much saccharine matter. The juice has been boiled into sugar, and has been found equal in quality to that extracted from the American Sycamore or Sugar Maple. Of the greatest delicacy however is the saccharine liquor extracted from the flower, which affords a beverage resembling Champagne in its briskners. I have frequently regretted, on our journey that the Indians used so little economy to procure this sweet juice. They cut the Palm and raising it partly from the ground, some vessel or other was placed under that end which had been nearest to the root, and a brisk fire having been made under the tree along its whole length, the juice ran out much more rapidly.

* * * * *

The creoles use frequently the juice which flows from the spatha, and mixing it with flour, it is converted into leaven.

* * * * *

The fan shaped leaves are used as a thatch for covering their houses, and the stump of one of these leaves serves as a broom to sweep them with. The Indians of the savannahs and the mountains use the case of the half-sheathing leaves, and form of it a pair of sandals.

* * * * *

But of the greatest use are the fibres of the young leaves, which with little manual labour are manufactured into Thread and Ropes; and they are of such a tenacity, that the greater number of Indian tribes fabricate their beds or hammocks of it.

* * * * *

Even in its decay the Mauritia is of use, and affords a delicacy to the Indian, which many colonists do not even refuse, in the larva of a large Beetle, the *Curculio Palmaram*, which is found in large numbers in the pith when the trunk is near its decay. The larva or grub called Oturuma by the Waraus is frequently of the size of the little finger, and, after being boiled or roasted, resembles in its taste Beef marrow. The Indians frequently cut the Mauritia for the purpose of attracting the Beetle to deposit its eggs in it, and when they collect a large quantity they are roasted over a slow fire to extract the fat which is preserved in Calabashes."

* * * * *

These extracts, many of which might stand for descriptions of the Palmyra, will remind the local reader of the Punatoo, and of the mode in which

it is made and eaten.—Europeans seldom eat it and we believe that it would be difficult to find a Tamil eater of roasted fruits or Punatoo by whom to discover whether his "*Linnen after perspiration assumed a yellow color*" for the obvious reasons, that the linnen worn by the mass of the Tamil people is not generally of a snowy whiteness, and that they do not very frequently indulge in bodily exertions which might lead to excessive perspiration. We learn that during the time of the Dutch, Punatoo was considered so great a dainty, that quantities of it, preserved in Sugar, used to be exported as presents to residents at Holland and Batavia.

PUNATOO.

It is to be hoped that the constant allusions to the various separate parts of the fruit will convey to the reader a correct idea of the portion from which *Punatoo* is prepared, but to make the matter clearer the parts are here described in detail. The terms are taken from Dr. Marshall's admirable description of the Cocoanut-tree, under the heading of *Fruits*, the constituents of the fruits of the Coco and Palmyra being identical. The Palmyra fruit is covered with a shining external surface (Epicarp,) which is scarcely separable from the fleshy fibrous part (Sarcocarp,) from which the Coir is procured in the Cocoanut, and in which lies embedded, in the case of the Palmyra fruit, the pulpy substance which in an inspissated state is termed Punatoo. A large portion of this fibre is torn longitudinally from the fruit in eating the pulp of roasted fruits and in making Punatoo, while another portion remains transversely attached to the nut (Putamen) which in this respect differ from the smooth shining surface of the Cocoanut shell. The nuts themselves, as Rumphius correctly observed, are scarcely fit for polishing, they being composed of an elastic substance resembling leather or Gutta Percha.—The Kernel (or Endosperm) is the part inside the nut and has been already described in treating of the mode of germination.—None of the above parts are eaten when the fruit is ripe, but what in the Sarcocarp of the Cocoanut is a dry fecula, is in that of the Palmyra fruit, a soft, mellow, luscious, semi-saccharine and farinaceous matter. This then is what is known as Palmyra pulp.—The period during which the fruits are obtained being short and a greater number ripening than the inhabitants can consume, Punatoo or preserved pulp is made in the following manner:—Pandals (stages) are constructed within 4 or 5 feet of the ground, and on these Palmyra-Leaf Mats are spread, the ripe fruits are then taken, torn up, put into Ola Baskets containing fresh water, and are there squeezed by the hands till the pulp with the water forms a Jelly. Layers of this Jelly are spread on the Mats to dry; this process is repeated for 15 to 18 days, one layer being deposited above the other until they amount to about 15, or attain to about

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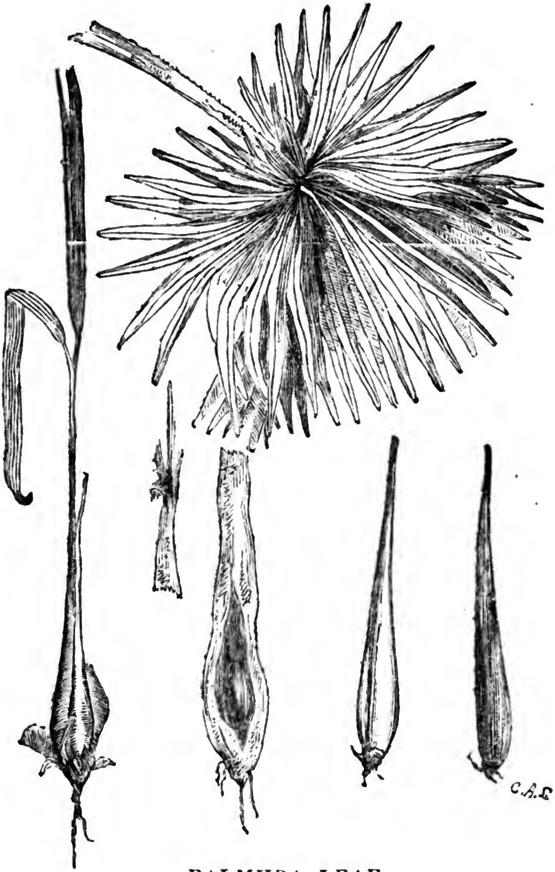
half an inch in thickness. The mats are exposed in the sun to dry, being covered at night and protected from the rains and dews.—The writer has seen this process carried on in a dry season at Ittavil in Patchelapalla, (*Green District,*) until the wells in the neighbourhood were nearly exhausted, and there was a difficulty in obtaining water.—The first sort is called ***Punatoo***, and the tough leathery kind made from the remaining fruits gathered at the end of the season, and which is much inferior to the other, is called தோற்பனாட்டு ***Tol Punatoo***.—Punatoo is sold by the ***Mat*** at 3s. to 6s each, (about 1,000 fruits of 3 Nuts each being sufficient for a Mat,) or in square cubits, and is the chief food of the Islanders and of the poorer classes on the Peninsula for several months of the year.—I have tasted this famous composition, and tho', in the ***Thala Vilasam*** it is compared to honey, milk, or sugar, deemed it not particularly agreeable.—It is preserved in Ola baskets or bags by being hung up in the smoke, and is generally eaten plain or mixed with gruel made from the pounded farina of the *Kelingoos* or young palmyra trees and with Cocoanut Kernel.—This substance is used in various other modes, entering into the composition of Soups, Puffs, Cakes, &c. but the full and graphic accounts contained in the Papers of Messrs. Cornelius and Vyremootoo and the Translation of the Thala Vilasam, all of which appear in the Appendix, render further details unnecessary here.

KELINGOOS—(BULBS.)

A young Native of Jaffna sending some of these to a friend, and being at a loss what to call them, turned to his dictionary and found they were "***edible roots***", the use of which general term has created some amusement at his expense.—These *Kelingoos*, as before stated, are not properly the roots but the young growing tree.—After the Punatoo, elsewhere described, is taken from the ripe fruits, the separate nuts are kept for future use, and at a convenient season they are sown in 6 to 8 layers, under loose, sandy soil, thrown up in parts of the gardens or fields close to the dwellings of the Natives. Planted in beds in this manner, there is, no doubt, a greater heat created in consequence of the fibre surrounding the nuts &c. which induces them to grow more rapidly than otherwise and better for purposes of food. As already stated, these are taken up when they are two or three months old, the nuts cut from the points of the leaves, and then the bulbs are exported or eaten in various ways.—To keep these Kelingoos for future use, they are deprived of the beautiful parchment-like sheath in which they are completely enveloped, and then dried in the Sun. Those dried in this manner before they are boiled, are emphatically called *Odials* (ஒடியல்கள்), and those boiled after are called ***Poolooc-Odials*** (புழுக்கொடியல்கள்). It is the *Odials* that are reduced to flour or meal of which the favorite *Cool*, or gruel is made.



PALMYRA LEAF.

Kelingoos, or young Plants in their earlier stages of growth.

Drawn by C. A. Lorenz: Engraved by Juan De Silva.

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The Kelingoos roasted, boiled, or cut into slips and fried like slices of Bread Fruit, are eaten by the Natives and will be found in the Bazaars of Colombo and elsewhere all the year round.—In their dried state they seem to be chiefly farina with a few fibres running thro' them, and their taste is very astringent. It is of the *Odials* that the flour once so prized by the Dutch, according to Bennett, is made; tho' in these days we never hear of this substance being sent to the Cape of Good Hope or Holland.—A substance called *Putoo* is made of the Kelingoo Flour—To the meal is added a little water—into this are put prawns or small fish—scrapings of Cocoanut kernel—unripe Jack Fruit, &c. This mixture is put into an Ola basket which is placed on the top of a pot of boiling water, covered over with a chatty, and cooked by the steam—this is reckoned a great delicacy—Jaggery is sometimes added, and the *Putoo* is occasionally eaten with Rice as a Curry.

Leaves or Fronds. Olas.

The uses to which these are applied in India are very numerous.—Each tree produces from 30 to 40 leaves, and in Jaffna they are cut some time before the fruits ripen, to allow the sun and air free access.—When they are intended for thatch of houses, and for making fences for gardens and fields, they are laid flat on the ground in layers over each other and often with weights upon them to assist in flattening them.—The thatch formed of these does not last so long, nor it is so handsome as that made from the plaited Cocoanut leaves, *Cadjans*.—The Palmyra thatch, when laid on well, lasts for two years, but being so plentiful and cheap, the leaves are generally renewed yearly.—They make very close and elegant fences, but are generally combined with sticks of the *Erythrina indica* already mentioned, or with 2 kinds of what are called Keelevy by the Tamils. These are two species of *Amyris*.—In Jaffna and doubtless in India the leaves are used extensively for manuring the Rice fields: the fan parts are put into the ground till they rot off, and this is found to be an excellent manure, giving a quantity of silicious and other matter to the soil.—*Mats* of various sizes, from 6 feet by 3 to 25 by 12, are made of the Palmyra leaves. These are used instead of carpets on floors, for ceilings, for drying the Punatoo upon, and for packing Chillies which are exported in considerable quantities from Point Pedro to the Colombo market. Large double ones are now used in Colombo for drying Coffee upon. Single and double Mats sell in Jaffna at prices from 3d each to 2s 6d.—Ola *Bags* are also formed of various sizes and are useful for purposes where strength of texture is not an object, and form clean linings to Gunny Bags.—The Tamil Proverb says, "Witchcraft is the easiest of all arts, and the common *Ola Basket* is the easiest of all Plaits." *Baskets* of various kinds are

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made from them: some of these are made into sets of 12 to 14 baskets, the one fitting into the other, the largest being about 1 foot 6 inches long, by 12 to 15 inches broad, and 9 or 10 inches deep. These look so smooth and pliable, that few unacquainted with the fact could conceive they were made from a substance apparently so stiff as the Palmyra leaf.—Water baskets for raising water, and applying it to the young Cocoanut Estates in Jaffna, during the first three years after they are planted, are formed from this leaf. These baskets are circular on the top but taper down in a triangular form to the bottom which is a point; a stick is fastened across the mouth to act as a handle.—Others are made large and round, with pieces of the stems of the leaves forming the rim; these are used for carrying Paddy (unhusked Rice), earth, and rubbish in. Numbers of *Winnows* are made of Palmyra leaves.—They are occasionally woven into ***Hats*** and Caps. Mrs. Tucker, in describing the Catamaran men of Madras, writes:—"With the letters safely lodged between ***the outer and inner lining of their Palmyra Caps,*** which are so closely woven as to be water-proof, * * * the men fearlessly mount their little bark, &c." In a Report of some recent experiments on fibrous substances at Madras the following passage occurs:—"Stalk of the Palmyra Leaf.—Fibres very tough, strong and thick, well suited for ornamental Basket work." At Jaffna the strips of Palmyra leaf used for ornamental basket work are boiled in a decoction of the bark of the ***Nāwel*** tree. One of the most singular purposes to which the Palmyra leaf is applied is that of being used as a plug to keep open and enlarge holes bored in the lobes of men's ears, and in which are ultimately inserted those huge golden rings and masses of Jewellery, which the wealthy among the Tamils are so fond of displaying. For this purpose a thin leaf is neatly cut into a narrow stripe and closely rolled up. In this state its tendency to expand assists materially in keeping the hole open.—***Umbrellas.*** These, though doubtless very good for protection from Sun and Rain, are rather inconvenient, as they are made in such a way that they cannot be folded. They have a handle and are about the size of an ordinary umbrella when expanded.—Single leaves are occasionally used as a protection from the Sun when the weather is very hot.—These with their stems attached are cut from young trees, the stems a little rounded, one side of the fan cut off, the other clipped of its points and spread out by being drawn down to the stem. These are made in a few seconds, and used perhaps only for the day. They are never carried in a folded state like the Tallipot leaves ***(Corypha umbraculifera.).—Fans.*** The most common of these are made much in the same manner as the single leaf umbrellas just described, but the former are cut much smaller and finished with a great deal of neatness. They are cut quite circular, to sizes varying from 6 to 10 inches in diameter. Around both sides

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of the edge of these, and also about an inch or so from the edges, are tied small ribs of the Cocoanut and Palmyra leaves, surrounded by nicely plaited tender parts of the leaf, as well as others which run right across the fans. A great variety of these fans are made, some very nicely painted and covered with pieces of transparent and colourless talc. There is another kind made to fold into a small compass, and again to expand, when wanted, into an almost perfect circle, very pretty and useful. These latter are made of the parts of the leaf between the little ribs: they are cut by a machine used by the Natives and then tied neatly together.—Palmyra Fans sell in Jaffna at 3d to 1s per dozen.

Books, Letters, Historical Records, &c. It is probable that palm leaves were among the first materials used for writing on. A well-informed Tamil Native furnishes us with the following information:—"The oldest Hindoo author who mentions writing on Olas is Panniny-rishee who lived about the year 790 of the Caliyugam; that is 4161 years ago, according to Hindoo reckoning. He resided near the source of the River Ganges at a place called Arrittuwarum. He was the inventor of the Sanscrit Alphabet, altho' verses in Sanscrit were in existence before his time, committed to memory and thus transmitted." Pliny says expressly that the most ancient way of writing was upon the leaf of the Palm tree, Lib. xiii Cap. 2.; an assertion with all the weight of evidence in its favour. The extracts in the Appendix are somewhat conflicting respecting the age of Palmyra manuscript books, and the number of years they are likely to last.—A Native who was applied to for information on this subject stated that he had a Palmyra or Tallipot MS. in his possession which was 300 years old.—I do not doubt that Palmyra-leaf MSS. 400 or 500 years old now exist in Ceylon. They are certainly of a more durable quality than Paper, and indeed resemble Parchment in their texture, when well prepared. I quote here a passage from Dr. Marshall's excellent account of the Cocoanut Tree, as applicable to the Palmyra Leaf, and not to that of the Cocoa which is seldom or never used for writing on:—

"The leaflets are sometimes used to write upon, and the instrument "employed to make the impression is an iron stylus, the pen of the "Scriptures. The stylus was used by the Romans to write on waxen "tables, leather, &c. The leaves of the Palmyra (*Borassus flabelli*-"*formis*), or Tallipot (*Corypha umbraculifera*), are, however, much "more frequently employed for this purpose. Contracts and other "legal instruments are often engraven upon tablets of copper, similar "in shape to a slip of the talipot leaf, which have occasionally a "border of silver or gold. An allusion is made to the practice of "writing upon tables in Isaiah, xxx. 8, and Habakkuk, ii. 2. Palm-"leaves, when they are prepared to receive the impression of the sty-

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"lus, are called *ollahs*. The natives write letters to one another upon "*ollahs*, which are neatly rolled up, and sometimes sealed with a little "gum-lac; in this manner they pass through the post-office. During "the operation of writing, the leaf is supported by the left hand, "and the letters scratched upon the surface with the stylus. Instead "of moving the hand with which they write towards the right, they "move the leaf in a contrary direction, by means of the thumb of "the left hand. To render the characters more legible, the engraved "lines are frequently filled by besmearing the leaf with fresh cow-"dung, which is tinged black, by rubbing the lines over with coco-"nut oil, or a mixture of oil and charcoal-powder. The natives can "write standing as well as walking, and they rarely use tables."

"Palm leaves, and perhaps the leaves of trees that do not belong "to this natural class, were much used by the ancients as writing "materials, hence the word *leaf* (of a book) is synonymous with that "of a tree."

It is evident, however, that in nearly every respect, excepting cheapness, the Tallipot leaves are superior to those of the Palmyra.—In a Budhist Temple near Galle the writer saw some beautiful gilt books, formed of Tallipot leaves, sent as a present from the King of Burmah to the Temple, or to the head Priest who seems a very intelligent man and who draws scenery pretty well. The Palmyra books are never much beyond 2 feet in length and 2 inches in breadth, as the size of the parchment-like webs between the little ribs will not admit of their increase in size.

Toddy.

This term, as will be seen from an extract in the Appendix, is a corruption of the Hindoo word *Tarr*, applied to the sap of this tree. The various descriptions of the modes of extracting this sap are very conflicting. Some writers say that a hole is bored in the *body* of the tree in which a *plug* is inserted, to be removed when Toddy is wanted! The head of the Date palm is cut off, a hollow scooped out to receive the ascending sap!! and, in other palms, "branches, leaves, and spadices" are cut off, and vessels tied to them to receive the sap, while "*cuts, notches*, and *incisions*" get their places in the catalogue of methods pursued.—The extract from Mr. Bertolacci's view of Ceylon gives one a good idea of the mode of treating the Cocoanut tree.—The mode in which Toddy is extracted from the Palmyra tree will be found described in the following paragraphs, the result chiefly of personal observation. From the best information I could collect, I find the Trees do not generally bear until 12 to 15 years after they have been planted; and then, and I believe not till then, can the Male be distinguished from the Female trees by the most acute Naturalist, Botanist, or Native cultivator of them.—I have

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examined trees of both sexes most minutely, and unless the spathas, or fruit stalks were to be seen, I could detect no peculiarity, in shape, size or colour by which I could distinguish them.—Were it possible to do so, it would be of the utmost importance to extensive cultivators of this useful Palm, as will be shown when the comparative value of the sexes is alluded to.—When they have arrived at the age mentioned, the Fruit Buds, Paly, or *Spathas*, begin, in the months of November and December, to protrude from amongst the leaves near the top of the trees which have then attained heights varying from 8 to 25 feet.—The next Natural course would be the bursting of these spathas, and the production of fruits, but in many cases the laws of Nature are herein completely thwarted, for the Nallavas, and Pallas, Toddy Drawers, now step forward and most completely, and I may say scientifically doctor the trees of both sexes, but oftener the Males, for the extraction of "TODDY"—the life juice of the *Inflorescence*. In the various written descriptions of the modes in which this is done, the information is generally contradictory, and unsatisfactory, to the reader.—Some writers, and recent ones too, state that the FRUITS of the trees are PIERCED &c.—I shall describe the whole process from observation as far as our Ceylon Palms are concerned, extracting at the same time what may be interesting from written accounts:—When the proper season arrives, which is in November and December, the too frequently degraded and drunken *Toddy Drawers* are seen and heard busy at work in the Palmyra groves throughout the Peninsula of Jaffna.—Their practised eyes soon fix on those trees that are fit for the "*Scalping Knife*", and if they have not dropped the Footstalks of the leaves, the first operation, if the trees are valuable, is to wrench these off. This done the Toddy Drawer, armed with his *leathern protector* for his *breast*, his *Raceme-Batten of Wood*, his small thongs, *Straight* and *Crooked Knives*, with the *Side leather Pouch* to contain them, procures a piece of tough jungle vine, or a strip of the Footstalk of a fresh leaf of a young Palmyra or Cocoanut tree, which he thoroughly twists, and then converts it into a sort of loop of such dimensions as to admit of his feet getting through to a span large enough to allow them clasp the tree. This done he puts his feet in this thong, stands close to the tree stretches himself at full length, clasps it with his hands, and pulls his feet up as close to his arms as possible; again he slides up his hands, and the same process is repeated, until, by a species of screw process, he ascends to the summit of the tree. When the trees are high, some use hoops of the same material, large enough to encircle both the tree and the Toddy Drawer who slides it up the tree, so that it is always a support to the body while the climber is in the act of taking a fresh grasp.

Arrived at the summit, amongst the leaves, the climbing apparatus

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is laid across a leaf-stalk, and the Pruning and Phlebotomy commence.—One or two of the lower leaves are left as a support to the Toddy Drawer until the operation is completed.—He then draws his crooked knife, which, on a small scale, a good deal resemples a Reaping hook, and rids the tree of all the accumulated dirt, such as old leaves, the net work which supports them; and, if an old tree that bore fruit before, the stumps of the Fruit stalks. Then all the leaves are cut off, excepting 3 or 4 and the young top bud of the tree.—Besides the removal of all these, the crooked knife is now used in shearing off the outer covering of that part of the tree from which spring the leaves and the racemes.—These latter are supported during this operation, by being tied up by several thongs to the footstalks of the uncut leaves.—The Pruning having been completed, all or most of the spathas are effectually encompassed from end to end, by thongs, to prevent the membrane which covers the Infloresence from bursting.—The racemes thus tied are then beaten and crushed between the Wooden battens to wound them, and to hurry on the flow of Toddy. This done and the Spathas being secured to stalks of the remaining leaves, the Toddy Drawer descends. The operation of beating and crushing takes place for 3 successive mornings, and on each of the 4 following a thin slice is cut from the points of the racemes, to encourage the flow of sap and keep them from bursting. On the eighth morning a clear sweet liquor begins to flow from the wounded racemes, which is indicated by the ***"Toddy Birds"*** and crows fighting and chattering amongst the trees.—The Toddy Drawer then ascends with a Chatty or Toddy Receiver stuck to his belt behind. He places the ends of the racemes in these, and when secured leaves them till evening, when they are found to contain quantities of this Liquor.—The operation of attracting the juice is repeated every morning and evening, or in the mornings only, until the whole of the raceme is sliced away.—The trees are drained in this way for several months of the year, but if the operation is repeated on the same tree for 3 successive years, without allowing any of the racemes to burst naturally, the trees are said to die.—In Jaffna a distinction is made between "***Toddy***" and "***Sweet Toddy***". The former, called by the Tamils Culloo, is the juice when it is allowed to ***ferment***, which it does in a few hours aften sun-rise; and when in this state "those who drink it, except as Medicine, violate the Rules of ***Temperance***". "***Sweet Toddy***" called "Carupaner, or liquor sweet as Sugar juice", is obtained by sprinkling the inside of the Toddy receiver with Lime or Chunam, which keeps it from fermenting.—The Toddy procured from the Male Palmyra tree is said to be sweeter than that from the Female.—Many trees are encircled near the ground with a strip of Tar &c. to prevent Ants and other vermin getting up and making a decoction of the Toddy in the Chatties.

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According to Mrs. Tucker a raceme continues to give Toddy for 5 months, and while seldom three buds are yielding Toddy on the Cocoanut tree, 7 or 8 will yield Juice at once on the Palmyra tree. An expert climber can draw the Toddy from about 40 trees in a few hours.—This Toddy would no doubt yield Arrack, but the writer has never heard of any being made from it, and Bertolacci states that for this purpose it is inferior to the juice of the Cocoanut Tree.—It is not a little amusing to notice the various comparisons to which this juice has given rise. Sir Wm. Jones compares it, fresh from the tree, to Poubon water, fresh from the fountain, or to the best mild Champagne; Malcolm, the American, naturally enough associates its taste with that of his native Cider; while Johnson, a traveller in Abyssinia ranks it no higher than Ginger Beer! It is possible it bears a resemblance to all these, and indeed a good deal of our Ceylon Ginger Beer is made from Toddy; but the writer begs to give his opinion that Toddy is dangerous in proportion to its *apparent* innocence; and, although so strongly recommended by Dr. Ainslie and others, it is questionable how far it can be used by those who do not wish to "violate the rules of Temperance." The result of partaking of it in the early morning is generally a listless drowsy sensation, much the same as that induced by Beer when drank in the heat of the day.—The practice of drinking Toddy is only pursued by the lower orders of the Natives in Jaffna, and so much disgrace is attached to the drinking of it, that when once I casually remarked to a Dutch descendant that he regularly walked out in the evenings, he denied it; and not understanding the reasons why he should do so, I enquired, when a gentleman present explained that it was for fear he should be suspected of resorting to the Toddy Topes, where "some of the baser sort" go for their "*Palm Wine.*" According to Vyramuttoo the average local value of the yearly quantity of Toddy obtained from a male is about 6d; while the quantity obtained from a female tree ranges from 6d. to 2s. The arrangement in Jaffna is one half to the owner and the other moiety to the Toddy Drawer.

Large quantities of Vinegar are made in Jaffna from Toddy. This Vinegar is used extensively for pickling Gherkins, Limes, the Cabbage from the heart of the Cocoanut and Palmyra trees, and several other substances. This Vinegar is prepared as follows:—A glazed earthen jar is buried three-fourths its depth in the earth, in a spot exposed to the full influence of the sun. A quantity of Palmyra or Cocoanut tree Toddy is daily thrown into the jar, until it is nearly full, when the mouth of it is carefully clayed up. The fermenting process immediately commences and continues for some months. At a certain stage of this process, which is ascertained by removing the cover and testing the quality of the Vinegar, a quantity of burnt paddy is thrown in, which in the course of a few days changes the watery co-

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lor of the fluid to that of Pale Brandy. The Vinegar is then fit to be bottled.—Toddy is almost the only yeast used by the Bakers throughout Ceylon.

Forbes in his Oriental Memoirs states that trees in the Bombay Presidency yield about 3 quarts a day, while Malcolm affirms that in Burmah they yield 1 to 3 gallons each.*—This latter writer also states that the Male tree gives Toddy for 3 months and the Female for 6 or 7, and that ladders are used to ascend upon. It is needless to say that no ladders are used in Ceylon, except the fixed ones tied round good Kittool or Jaggaree *(Caryota urens)* trees; tho' the idea of a portable jointed ladder may not be a bad one for Proprietors of Cocoanut and Palmyra Plantations, should the attention of Europeans continue to be so earnestly directed as at present to the attainment of Sugar from those Palms.

Mrs. Tucker's interesting account of the Shanars of Tinnevelly will afford a pretty fair idea of the condition and habits of the Toddy Drawers of Jaffna; only that the Nalluas and Pallas of Ceylon are poorer and more degraded, arising naturally from the fact that from time immemorial up to 1843 these unfortunate people were in a condition of slavery. Altho' now free in law and in fact, generations will pass away, before the melancholy effects of so wicked and debasing a system disappear. The risks attendant on their dangerous pursuit, aggravated, no doubt, by their habits, are indicated by the fact that in a return of Inquests for 1842-3, no less than 6 deaths are recorded as attributable to falls from Palmyra Trees. Cassie Chitty, in his account of the Tamul Castes, enumerates *Chander*, *Kadeyer Nalawer*, as constituting "The different tribes of people employed in distilling Toddy and in manufacturing coarse Sugar;" and in a note to the term Chandar (or Shanar) he states that they are divided into seven classes, comprising:—

5. *Tennamatte Chanars,* or Toddy Drawers from Cocoanut Trees.
6. *Panematte Chanars,* or Toddy Drawers from Palmyra Trees.

[Desirous of obtaining the best possible information regarding the "Toddy Birds" alluded to in this work, and wishing to identify if possible the "Maranaya" of the Tamils, (Palmyra Dog of Rottler,) I applied to a gentleman distinguished as a Naturalist, Edgar L. Layard, Esq., Magistrate of Point Pedro, (brother to the gentleman whose researches in the ruins of Nineveh have obtained for him a world-wide fame.) The nature of my enquiries, is indicated by Mr. Layard's re-

* These quantities need not be considered great when Roxburgh affirms that in Bengal the CARYOTA URENS has been known to give 100 pints in 24 hours, and a gentleman in Colombo states that he once saw a pipe leading from one of these trees to the ground, because the sap flowed too fast to allow of the ordinary method of hanging up pots and removing them when full.—According to a Native informant a Male Palmyra will yield 100 measures (the measure a little more than a quart) in the Season: the Female 560 to 600.

ply, which, with his permission appears below. The small ash-coloured swallow is doubtless the "Toddy Bird" *par excellence*—and very drunken and disreputable are the little fellow's habits. An animal similar to the "Maranaya" pilfers quantities of the ripe saccharine Coffee-*Cherries* from estates, and is troublesome to the drawers of Kittool Toddy in the Central Province.—EDITOR.]

MR. LAYARD'S LETTER.

Point Pedro, 2d May 1850.

DEAR SIR,

I am in receipt of your letter of the 23rd April, requesting information on the "Mara-naya", and on certain birds which drink the Toddy from the Pots.

In the first instance "Mara-naya" is a bad word altogether, as the Animal is a cat—*Felis Vivenina*—at least I am led to believe it to be this animal, because the *majority* of the natives agree in assigning the Tamul name to this species which is abundant here—Many of them on the other hand bestow the name on a Civet*?* (*V. Zibetta*)? which has just been pointed out to me here—We have also a large cat, which may prove to be a variety of *F. Chans*, and to this animal also the name is applied.

Which ever the animal may be, it certainly *does not eat* the fruit of the Palmirah, but only ascends it in search of birds at roost, or to get at the native hen-roosts which are generally suspended between two trees for security.

Your *Canis Zeylanicus* is most probably *Paradoxurus Zelanicus*, not uncommon near Putlam.

On the next point in your letter, it is equally impossible to give positive information from the vague description you give—Nearly all birds resort to the toddy pots to quench their thirst, but from the *Chattering* to which you allude, I should be inclined to think your brother meant the wood-swallow, *Artamus Fuscus*, which is of an ashy-blue color with a sharp pointed angular blue beak.

It is common all over the island in detached flocks, and is not confined to the Borassus-growing districts.

You are at liberty to publish this, if it is of any assistance to you.

I remain. Dear Sir,

Yours obediently,

E. L. LAYARD.

JAGGERY OR SUGAR.

These terms are variously derived from the Sanscrit *Sakar*, Arabic *Shukar*, whence the Latin *Saccharum*, and the English *Sugar*.—It appears that in the time of Menu, upwards of 4,000 years ago, the Hindoos knew how to make Sugar from the flowers of the Madhuca tree *(Bassia latifolia)*; and this being the case, there is great reason to suppose that Sugar was made from some of the Palm trees at a much earlier period. Sugar Candy is alluded to by Megasthenes under the name of "Indian Stone", and to this day the crystals formed either from Jaggery or the Juice of the Cane are called "Catcandoo"

or Stone Sugar. The common Indian name for the finer sorts of Sugar, "Cheenee" has been supposed to point to the Chinese origin of the production. Be this as it may, it seems quite certain that Sugar, in various shapes, was made and used by the people of India and of China at a period in history too remote to be traced. The descriptions of the various modes of making Jaggery and Sugar are as conflicting as the modes of obtaining the sap from the trees, but is hoped that on this subject a good deal of interesting and useful matter will be found in the Appendix.—According to Forbes 3 quarts of Toddy will make 1lb. of Jaggery. Malcolm remarks that Jaggery resembles Maple Sugar and that in the neighbourhood of Ava a Pound sells for ⅜d of a penny. In Jaffna according to Vyramuttoo 3lbs. are sold for 2d.—The usual process of making Jaggery, as pursued at Jaffna,is exceedingly simple:—The Sweet Toddy is boiled until it becomes a thick Syrup, a small quantity of scraped Cocoanut Kernel is thrown in that it may be ascertained by the feel if the syrup has reached the proper consistency, and then it is poured into small Baskets of Palmyra leaf where it cools and hardens into Jaggery. In these small plaited Palmyra Baskets it is kept for home consumption; sent coastwise, chiefly to Colombo; or exported beyond Seas to be refined; the proceeds, in this latter case being invested in Grain, Cloth, or Metals. In the year ended 5th January 1850 it appears that the total export of Jaggery from Ceylon was 9,580 Cwts., bearing a Custom valuation of £1,937. By a Return with which I hope to be favoured before the last of these sheets passes thro' the Press, I think it will appear, that fully two thirds of this export consisted of the product of the Palmyra. I should however wish to steer clear of the only error I can discover in Dr. Marshall's valuable account of the Cocoanut Tree. He quotes the return of Jaggery exported in 1813, as if *entirely* the product of the Cocoanut Tree.—To make *Vellum* or crystalized Jaggery, which is extensively used as a medicine, the process is nearly the same as for the common substance; only the syrup is not boiled for so long a period. The pot which contains it is covered and put aside for some months, at the end of which period the crystals are found in abundance. The juice of the Palmyra is richer in saccharine matter than that of most other Palms, in consequence, perhaps, of the Tree more generally growing in dry sandy soil and in a dry climate. About 3 quarts of Toddy suffice for boiling into 1lb. of Jaggery. The great fault of the Jaggery made at Jaffna seems to arise from the too free application of lime, a small quantity of which is of course absolutely necessary, to prevent fermentation, not to produce it, as Mr. Roberts erroneously supposed. Jaggery, according to Malcolm and Crawford, forms an article of commerce from the upper to the lower provinces of Burmah. And its importance to some of the Islands of the Indian Archipelago will be apparent from the following ex-

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tracts from the Penny Cyclopedia:—"In Sawu in dry seasons, when "the crops fail, the inhabitants derive subsistence from the Sugar "of the Lontar-tree (*Borassus flabelliformis*). This Sugar is also "the only article of export and carried off by the Bugis." Pen. Cyc. vol. XXIII, p. 288-9.—Under Timor p. 289, same vol. "Maize is "the principal article of food, but the produce is not equal to the "consumption, for except in very plentiful seasons the inhabitants "depend for subsistence during a part of the year on the Sugar of "the Lontar-palm."—Jaggery, besides being exported in large quantities, forms a considerable portion of the food of the Tamil people of Jaffna. Amongst a variety of purposes to which it is put, is that of being mixed, together with whites of eggs, with lime from burnt Coral or Shells. The result is a tenacious mortar, capable of receiving so beautiful a polish that it can with difficulty be distinguished from the finest white marble. It is stated that Palm Sugar, which is chiefly the produce of the Palmyra tree, is more granulated and higher priced than that obtained from the Cane, and that large quantities of this Sugar are imported into Europe from Cuddalore and Madras. A gentleman who lately crossed the country from Cochin to Tutocoreen, stated that this year no less than 1,000 Tons of Jaggery were sent from the latter port to Madras or Cuddalore; and that 100 Tons collected in 14 days, about the time our informant was there, were sent to London by a gentleman at Tutucoreen as a trial shipment. The annual export of Sugar from Madras is about 9,000 tons per annum, a considerable proportion of which I believe is Palmyra Sugar.—During the Government of Mr. Stewart Mackenzie a French gentleman submitted to his notice some loaves of very fine Sugar, manufactured from Palmyra Jaggery, and offered to establish refining works at Jaffna, provided he were vested with a monopoly. The proposal, was, of course, rejected as opposed to the commercial policy of the age and the true interests of the country and people.

Note by the Editor.

[The Palmyra Jaggery made in the Jaffna Peninsula, forms so considerable an article of export from Point Pedro to the opposite Continent, that the question has, very naturally, with great frequency and force recurred, why a Manufactory for refining should not be established where the raw material is so abundant? On this subject, and that of forming Plantations of Palmyras, with ultimate reference to Sugar, I requested, while these sheets were passing thro' the Press, the opinion of one of the oldest Planters at Jaffna. His views, as given below, are rather discouraging; but I still think that the idea deserves the serious attention of the settled inhabitants, and even of Europeans, who are not so much "in haste to be rich" as anxious to prôvide an inheritance for their children. My correspondent having, naturally

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enough, while discussing the question of Palmyra Groves, as Sugar Estates, taken up the kindred subject of Cocoanut Sugar, so ably brought before the Public by the Messrs. Taylor of Batticaloa, I considered it fair to the latter, to place them in possession of a proof of the Jaffna communication, intimating my readiness to publish such remarks as they might favour me with. The result is the letter signed by Mr. Glanville Taylor, a gentleman of much talent and wide experience. These communications will I am sure add interest to this little work and help forward enquiry and discussion calculated to yield very useful results. Could a Palmyra Sugar Estate, formed on a large scale, be cheaply and profitably worked, it would have the immense advantages of flourishing on the most sterile soil without exhausting it; of dispensing with crushing Machinery, fresh supplies of Cane, ratooning, &c.; and of lasting almost literally for ever.

The Palmyra, flourishes with little care and independently of irrigation, in a climate, at Jaffna, where for 6 to 8 months, sometimes, there is not a shower, the total fall of rain in a year amounting to less than 45 inches; in soils which two crops of Sugar Cane would utterly exhaust, and some of which, when chemically analyzed, gave the following results:—

Silicious Sand	...95
Organic matter	... 1
Alumina	... 2
Peroxide of iron...	... 1-3
Undetermined	... 3
	100

Indeed the soil in which Palmyras grow, is sometimes so purely silicious, that large portions of it have no power of coherence but are driven hither and thither by the wind, forming *dunes* or mounds of sand, white as the driven snow and nearly as fine. At Catcovelam, about two miles to the Eastward of Point Pedro, occurs a very remarkable series of these mounds, extending for many miles and occupying the site of habitations which they have over-whelmed. It is strange to see the tops of full-grown Palmyras peeping just above those mounds. Mrs. Tucker notices the same feature, as common in Tinnevelly.]

PALMYRA & COCOANUT PLANTATIONS AS SUGAR ESTATES:—SENTIMENTS OF A JAFFNA PLANTER.

I have paid some attention to the Palmyra Tree ever since I came here, and planted a considerable quantity in 1841, and continued to do so for several subsequent years in different parts of the Cocoanut Estates; namely along

the roads, fences, &c. &c. At 8 years old they were about 6 feet high with about one foot of stem—I subsequently parted with the property, and the manager of the purchaser the following year rooted them all up; I suppose fully a hundred thousand. Having paid particular attention to the growth of the Palmyra, I am satisfied it will not bear fruit under 30 years, at least in this district. I come to this conclusion from the recollection of the height of different trees near my house, when I first came here and the progress made in that time. In this respect the Palmyra resembles the Date of Egypt, which, I was informed there, took that period to fruit—The Native plants his Palmyras very close: I have seen them 4 feet apart, but before coming to maturity they get considerably thinned. I do not think I have ever seen a garden of grown trees, with more than 1,000 to the acre, of which half would be male and of much less value, for tho' yielding toddy yet in less quantities; and the timber of the male tree is generally almost worthless for building purposes, it being white and as soft as a cabbage stalk within an inch of the outer bark—The tree frequently suffers in its growth from the attacks of the beetle, both red and black, but in a less degree than the cocoanut. In cutting down the Palmyra trees I have found them at times entirely hollowed out by the beetle, but as the trees get old and the wood hard they suffer less—When the trees are planted very close, they grow up thin and bear less fruit, and the leaves are smaller.—Palmyra trees can only be tapped for about three months in a year, for in this respect they differ from the Cocoanuts:—the Spathas of the Palmyra all come out at about the same time; those of the Cocoanut tree monthly. I think the Cocoanut tree will not give more saccharine matter in the year than the Palmyra; nevertheless, Palmyra trees will grow in any soil if not flooded, and do not require the least care. I doubt if even a fence is required, for Cattle but rarely touch them, or injure them. An acre of Palmyra land to contain 3000 trees would be planted for 2 £ per acre inclusive of cost of land, the jungle only to be cut down but not rooted out—Say land £ 1 5 0

Clearing	,,	10	,,
Tools and overseers	,,	5	,,
	£ 2	0	0

An acre of land would let at rent, if say 300 good trees remain on it, at 2d per tree in this district, or £ 2 10. per acre; in the Point Pedro district, at 6d. to 9d. per tree per annum. A tree in this district is only worth from 1s. to 2s.; in the Point Pedro district from 3s. to 7s. 6d.—Population is dense at Point Pedro and the trees better, they being it may be said cultivated. I am rather inclined to doubt if Cocoanut Estates could be made profitable sugar Estates—Toddy-drawers cannot be had here under 4½d. per day, and a Toddy-drawer will not draw toddy from more than 20 trees a-day,* therefore the account would stand thus.

60 trees per acre 13½d. per day per 60 trees per 300 days £ 16 17 6.

* Mrs. Tucker and most authorities state 40 trees as the number that can be attended to twice a-day.

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Supposed produce 3 Tons, (which is high), equal to per Ton	5	15	0.
To labour for manufacturing per Ton	3	0	0.
Interest on the Capital sunk in a Cocoanut Estate £ 30; per acre	1	0	0.
Say total per Ton £	10	0	0.

But if your labour is 6d. per day, your cost per Ton of Sugar will be at least £ 12, and I doubt if labour of that nature would be got under 6d, certainly not now—It is not known that Sugar can be grown with slave labour in the Brazils and Havanah for £ 6 per Ton, and in two years more what remains of protection will cease: how therefore could we compete with their Sugar, £ 6 cost and £ 8 expences to Europe, £ 14—our Cocoanut Sugar £ 10 to £ 12 cost, and £ 10 expenses to take and sell in Europe, Total £ 22?—The reason why jaggery is made from the Palmyra trees is: every native has a few trees near his house, he puts a portion for the fruit and the rest he makes into jaggery—he gets up early in the morning, draws the Toddy and his wife makes the jaggery, and this without leaving the compound; and after he has drawn his toddy he can attend to his garden. Jaggery is worth about 4 £ per Ton. It will give at Cuddalore 60 per cent. of good Sugar. I believe about 2000 Tons of Jaggery Sugar, are exported from Cuddalore annually. In certain districts here toddy could be bought and could be made with advantage into Sugar at once—The Palmyra fruit has many enemies: the tree dog, colour black, jaw rather like the Pariah dog but sharper, legs very short like Mungoos; also squirrels and rats; these two latter do much injury in this district. Many birds drink the toddy as well as bats.

SUGAR FROM PALMYRA & COCOANUT TREES: SENTIMENTS OF A BATTICALOA PLANTER.

Batticaloa, June 16, 1850.

MY DEAR SIR,

I have looked over the observations on the Palmyra Tree, which you tell me are by a Jaffna Planter, and in many respects I concur with him. I have often thought and said, that were our Government a little more wise and thoughtful than I believe them to be, means would be taken to cover the major part of the waste lands of Ceylon with not unprofitable plantations; in which work the Palmyra would be most valuable, as well as the Kettool, or Caryota urens, Jack, Bread-fruit &c., and I believe the expense would little exceed, and in many cases be less than what your friend puts down. We know that this is being done under other governments; witness the immense plantations of trees being made in Upper India, in the Province of Ajmeer &c. and I doubt if of so valuable kinds as we have. But this is a question for a volume, and a work for a government.*

* The above looks like heresy even at this distance from Manchester. How does the idea of Government clearing waste grounds and forming Plantations accord with the doctrines of Political Economy and "the Spirit of the Age"? That in India Government should supply the means of irrigation seems absolutely a matter of necessity; clearing of jungle and planting are not however so plainly

MR. TAYLOR ON COCOANUT SUGAR.

Speaking still of the Palmyra, it is very certain that cattle injure them greatly, and that, (at least here,) the trees would grow up in less than half the time they now take, but for them. I find the seeds take six months and upwards to complete the process of vegetation; that is, one month to begin to throw down the root, and five or six more to send up the cotyledon. I have seen them growing in very wet low places, overflowed annually; e. g. at the back of Poolientieve.

Your correspondent does not give us a chance to compare the yield of sweet sap of the Palmyra with the Cocoanut, since he does not state the former, though he *thinks* the yield of the latter not *more*. A friend of mine resident in Jaffna has stated the yield of the Palmyra to be about 80 gallons during its four months' season. Our observations here made on two cocoanut trees attended to by a man we could depend on, gave at the rate of double this for the time they were on trial. A subsequent trial, on a larger scale, has been quite unsuccessful in producing any result, except convincing us of the utter inutility of employing daily laborers in this duty, unless we could get Toddy-men of a more *angelic* caste than any to be found at Batticaloa.

Your friend may doubt if he pleases about the profit of making Sugar Estates of the Cocoanut Plantations; but to the best of my belief no one here has ever asserted that proposition. All that we ever proposed to do, was to inquire into the matter, keep registers, and invite others to do the same; which I am sorry to say they do not seem inclined to do. But what I do say is, that provided a proper system of working on shares were introduced, I have little doubt it would be profitable as far as it went.

Your friend is *very wrong* in placing a limit to the number of trees drawn from. *Here* we have accomplished 30, and under a proper system it is hard to say how many more may be added. In the cases to which I allude the men put *bark*, change and wash and clean all the pots twice a day, and bring the "panee" to the boiling house without assistance. It is well these statements happen to be privately communicated, and I think it is injudicious to say anything whatever now, except to invite inquiry and communicate results.

All this, however, shews you, that I place no reliance on your correspondent's figures, which seem to be run wild. With the juice delivered into the receiver, I declare he makes it cost as much to boil down, pot, and cure it,

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functions appertaining to Rulers? But whether the work be one for Government or not—whether the limit of Governmental interference is not reached when it provides good means of communication and protection to life and property—it is clearly the duty and the privilege of private individuals, who have time and means at their disposal, to engage in the good work. And all honor and success be to them who fulfil the primal duty of "tilling the ground." Cordiner observes:—"The Coco-nut, Palmyra and Jacca-Trees may be esteemed the staff of life in Ceylon, and a certain resource against the failure of more precarious sustenance. The man who plants any one of these useful trees, confers a lasting benefit on himself, and hands down to posterity more certain riches than can be procured in less genial climates by a life of the most toilsome labour."—EDITOR.

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as formerly we used to calculate for cutting, carting, and grinding cane, and manufacturing it into sugar, including hire of carts and all expenses; nay, per *acre*. It is clearly useless to say anything, much less to make calculations on our present data.

Your correspondent states that sugar can be made in Brazil and Cuba for £ 6 per ton. I should like to know his authority for this astounding information, which surprises me as much as to hear that it costs £ 8 per ton to ship their sugars to Europe. I have resided in Cuba, and know something of it, but I never heard of such prices and freight; however I am more inclined to place reliance on Consul General Crawford. Vide last Sugar Blue Book p. 432. "To produce 4000 boxes 400 lbs. each, gives 9 dolls. per box, equal to about 1d. sterling per lb. of Sugar, to which must be added the interest upon the capital employed at six per cent, bringing up the price to 1⅜d. per lb. to the producer." This is £ 16. 6. 8: rather over your correspondent's figure. To be sure this is counting capital outlay. Why not? your friend also does the same with the Cocoanut Estate; but whereas the capital of that may be 1, 2, or 3 thousand, that of the Cuba Sugar estate may amount to forty times as much. At 1d. per lb., which is the *very possible lowest* price I ever heard hinted at in Cuba, we have £ 9. 6. 9 and after all, your correspondent puts the Cocoanut Sugar down at £ 10. Well, even then, I am promised 37/6 per cwt for Sugar equal to the samples we have sent home. No one builds on Cuba or Brazil statistics; that is a bubble which may burst any day, or say rather, a barrel of powder near a smouldering fire: we do not see that they *practically* influence the market.

The produce of India generally, and *also* of Ceylon, is collected, (except plantation Coffee,) in ways past our discovery. Let a European for instance make a "chena", by hired labor. Let him *fell*, *burn*, *fence*, and *plant* it, and *watch* the produce, from birds' and beasts' attacks. Then let him gather up the result, pumpkin by pumpkin, and one cotton pod after another; let him cut, bind, and thrash his coorracan and dry paddy; then let him balance up, and feel his pockets. When you buy a bushel of paddy from a native for one shilling, it may have *cost him three*. This is doubtless a mystery; and in its solution behold the fate of the Cocoanut Sugar!

Draw your own conclusions.

J. G. TAYLOR.

Denseness of Palmyra Groves, and number of trees to an Acre.

Respecting the proper mode of cultivating many of the vegetable productions of Ceylon, so as to make them yield the greatest quantity of fruit &c., some of the Natives have yet a great deal to learn. Close to the Maniagar's (Native Headman's) house in Patchelapalle there was, and perhaps now is, a grove of Palmyra trees so thickly planted that the observer when amongst them could not see the sky through them. They had a desperate struggle for existence, and, what

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very seldom indeed happens, some were killed for want of light and air; and of a flock of Monkeys taking shelter in the leaves, running thro' them making a loud rustling noise, scarcely a glimpse could be had, tho' the trees were not much above 20 to 25 high. The leaves not only touched each other but inter-mixed or crossed. On the Island of Caradivoe, close to where the heights of some trees were taken, about 30 distances between the trees of a thickly planted grove were measured, the greatest of which was 10½ feet, and the least 4 feet, and the whole averaged only 6½ feet.—Now as the spread of the leaves at the top in a good tree is 11 to 12 feet, it is clear that unless they are planted a little further apart even than this, they cannot flourish to perfection and bear fruit, altho' it is admitted that the Palmyra seems to bear privation in these respects better than the Cocoanut tree.—A writer in a recent No. of the *Colombo Observer,* alluded to the mode practised in Galle and elsewhere, of planting Cocoanut trees under the shade of old ones, as injurious, and truly characterised it as unprofitable. It would appear however, from the result of my observation, that about 300 Palmyra trees can be planted on an Acre of ground, while the usual number of Cocoanut trees to an Acre is 75 to 100.—Mr. Vyramuttoo's statement that 648 can be planted on a Varagoo Lacham of ground, which is the 16th part of an Acre, is rather startling, but the honest Point Pedro Merchant has no doubt made ample allowance for *thinnings.* The area of Jaffna Peninsula and Islands is about 700 Square Miles. I think we may safely assume that 1/14th of this surface is covered with Palmyras. If so, 50 Sq. miles=32,000 acres, at the moderate average of 200 to the acre, would give a total of 6,400,000 Trees. The population being 200,000 this estimate, if correct, gives 32 trees for each individual.

Heights and dimensions of trees.

When it is considered that 60 to 70 feet is about the height of full grown Palmyra trees in Jaffna, we cannot but be astonished at the Cabbage Palms, (Areca oleracea) of the West Indies, some of which Dr. Carpenter declares to having seen 210 feet high, or about 3 times as high as a Palmyra tree.—Had the writer of this depended on a young Native whom he employed to measure some tall Palmyra trees in Jaffna, he would describe them as 200, 210, and 220 feet high, these being the heights given him; but from actual measurement by the writer himself of some very high trees close to Kaits in Jaffna, and one at Mutwall near Colombo, the following are the dimensions. 1st tree, on the Island of Caradivoe close to Kaits, 61½ feet high from ground to where leaves commence; girth at bottom 5 feet 6 inches, at top 2 feet 4 inches. 2nd tree 62½ feet; girth at bottom 5 feet 8 inches, at top and middle 2 feet 10 inches. 3rd,

58½ feet high.—The tuft of leaves at the top measuring 11 feet every way.—One at Colombo 60 feet high; girth 2 feet from ground 4 feet 9 inches, ½ way up 2 feet 6½ inches, and 1 foot 11½ inches at a sudden narrowing near the top. This latter feature is not uncommon in Palmyra trees. A tree will frequently be found whose diameter at 20 or 30 feet from the ground suddenly diminishes, swelling again towards the top. Seasons of drought may probably account for this circumstance. The trunk of the Palmyra is frequently found covered with a small species of fresh water Mollusk.

Several Headed Trees, &c.

The Dragon tree of Teneriffe divides into several ***branches,*** and the Doum Palm ***(Hyphœne coriacea)*** of Upper Egypt is Dichotomous, or divided into regular pairs of Branches; but the departure of our Indian species from their abnormal state is very rare indeed. However the phenomenon of a several headed Palmyra tree is sometimes met with. The first one the writer saw was some years ago on Mr. Hardy's Estate at Jaffna. It was a Male tree, having 4 heads then upon it, with marks where 3 or 4 others had been. These divisions began about 25 or 30 feet from the ground. Other specimens are found in the Peninsula, on the Island of Delft, and in the smaller Islands near Jaffna, and the writer saw one some months ago near Oodooville with 6 heads on it. One of these grew nearly in a line with the body of the tree, while the other 5 grew out from the side of this one, all from the same centre, but bending somewhat outwards before they could attain their upright posture. There are marks where other 3 had been. (See the Drawing by Mr. Koch, transferred to wood by Mr. Lorenz.)—The tree mentioned by Mr. Forbes in his Oriental Memoirs. (See Appendix), as having about 40 heads, was probably a Palmyra.

[This seems the proper place to mention the fact, communicated to me by a friend, that the late W. K. Burleigh, Esq. of Jaffna, had discovered a Palmyra Tree which regularly bore both male and female inflorescence. Whether it perfected its fruits I am not aware.—While on the subject of deviations, I may, perhaps, introduce a notice of a very curious Cocoanut brought to me a short time ago. From the stem of what appeared to be an ordinary Cocoanut, sprang, on each side, three fac-similes of half ripe plantains. The resemblance was so perfect in every respect, that it was difficult to believe that actual fruits had not been joined to the Cocoanut. Like the nut, however, they consisted simply of fibre. The nut when opened shewed no sign of even the germ of a kernel, but there were 3 small triangular cells. Not having yet had time to examine the flower which produces such a *lusus naturæ,* I am unable to speak positively upon the subject, but the following appears to be an explanation of the

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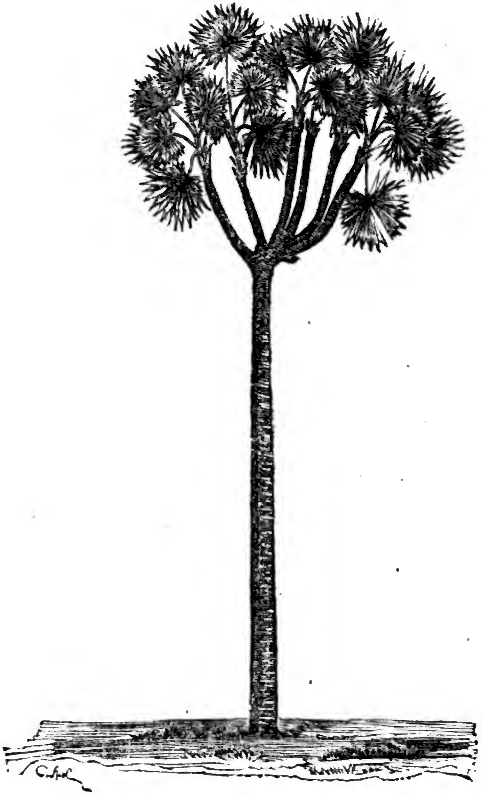

MANY HEADED PALMYRA.

Drawn by Mr. John Koch: Transferred to wood by Mr. C. A. Lorenz: Engraved by Mr. Juan De Silva.

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phenomenon. Such Trees are know by repute to most Natives as the Male Cocoanut tree, but I never yet met a person who had seen one. Here, however, is a fruit in my possession, and here also is my theory of its existence. The ordinary Cocoanut plant is Monœcious (that is, has the Male and Female flowers upon the same tree) The Male flower is Hexandrous, (that is has Six stamens) and the Female three Stigmas. The Male flower has also three rudimentary stigmas. In like manner the Female flower—i. e. the Nut—has six scales or appendices forming a Calyx (whilst the Male has only three) which are probably the result of six rudimentary stamens. In the natural or ordinary condition it would therefore seem that each flower, besides its own perfect organs, has the rudiments of those of the other —the Male flower having rudimentary Female organs, and the Female flower rudimentary Male organs. Now, my idea is that the flowers of the tree in question approach the hermaphrodite form, the Male part, or Six stamens being preternaturally developed and ultimately becoming the Plantainlike appendages; and the Female part, or three Stigmas, becoming barren, as indicated by the three separate cells found in the body of the fruit.—EDITOR.]

MISCELLANEOUS NOTES AND OBSERVATIONS.

[*At the risk of presenting the reader with some repetition of matter already printed, I place here a paper of unconnected notes left by my brother and meant to have been worked up under the several headings, but which escaped my particnlar notice. Should this little work ever reach a second Edition, there will doubtless be great room for improvement, in a more regular arrangement and greater condensation of matter. In the meantine I have done my best with materials collected over a series of years, but with whose final arrangement by the collector himself, serious illness, necessitating a sudden departure from the Colony, interfered. This circumstance will, I trust, prove a sufficient apology for the absence of due elaboration in many places, and for an abrupt and unfinished style of composition. More time at his disposal would doubtless have enabled the writer to have rendered his production clearer and more acceptable.*

The opportunity for improvement in these respects may yet occur; and with reference to such a contingency, the Editor begs to say, that he will feel grateful if favoured with communications containing friendly corrections of statements here made, or embodying facts which his brother has either omitted or overlooked. Address "A. M. FERGUSON *Colombo.*"]

The extraordinary assertion of Rumphius that the Female Palmyra tree once, and once only bears flowers like the Male, is not true of this tree; although it is now well known that Nutmeg trees which have been entire-

ly males for one or two years, have become transformed into entire fruit-bearing trees, or half male and half female, after a few years. The *Gabang* or *Kopong* tree (often called *Borassus Gomutus* tho' properly *Saguerus Rumphii,*) of the Indian Archipelego, bears the male and female spadices on the same tree, and the irregularity in the proportions of these are occasionally unaccountable; they sometimes produce 6 or 7 female spadices ere they produce one male, and vice versa; and these capricious variations have a great influence on the tree as to the Sago &c. procured from it.

The only Drawings of the Palmyra seen by the writer, besides those executed for this description, were: one in Rumphius, which is by no means faultless; and one inthe Penny Cyclopedia which bears as much resemblance to the *stiff, tall, and unbending Palmyra tree* as do weeping Ash or Willow trees. It is evidently an imaginary* tree, while the drawings of the male and female spadices on the next page (see *Borassus*) are most excellent, the length of the barren stamen on fruit excepted. The Drawings in Loudon's Enc: of Plants, of its male and female spadices, with a section of a fruit showing the 3 nuts or kernels, are equally good, and are very likely taken from Roxburgh's Coromandel Plants; Tables 71 and 72 of vol: 1st. which are no doubt the best published, being referred to by most modern authorities, but which the writer regrets he has not been able to see.—Mr. Thwaites Supt. of Botanic Gardens at Peradinia, however, kindly got Roxburgh's description copied and sent which enabled me to embody much of it in this work.—Squirrels and Monkeys are very destructive to Palmyra trees, the former eat holes into the fruits which then fall down with only one or two of the Nuts left uneaten; and the large grey Monkeys from their great weight send down numbers while springing from tree to tree.

Large numbers of the Palmyra fruits are also pulled or cut off the trees before they are ripe: these are called *Nungoos,* the mode of eating which is to cut a slice off the top of the fruit until the kernels are reached, and then the soft jelly is scooped out with the finger when it is delicious and cooling; but tho' highly extolled it is said to be dangerous to eat much of it as it induces Dysentery. Europeans sometimes eat this and the young Cocoa-Nut, mixing Sugar and Wine with the pulp; while the Orientals, with a taste more innocent and refined, flavour the jelly of the young Palmyra with Rose water.—

In some of the Jaffna Jungles the large Monkeys effectually take up their entire abode in these trees, and when the sportsman is after them, it is amusing to see how these animals conceal themselves in the leaves, giving an occasional peep at their enemy. When they are however surprised in single or distant trees, too far apart to enable them leap from one tree to the other, and especially if a dog accompanies the sportsman, they are doomed, for they keep looking down at the Dog as if fascinated, and are thus frequently shot in great numbers.

Palmyra trees grow perfectly upright, and never vary from this position unless from accident.—The Cocoanut tree on the other hand never grows straight, and in a Tamil Proverb it is stated that a person who has seen a straight Cocoanut tree, a Paddy Bird's nest, a dead Monkey or a White Crow will never die.—The effect of the groves of tall, stiff, unbending Palmyras, which cover the flat surface of the Jaffna Peninsula, is to communicate to

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the Scenery an air of great uniformity and tameness. To the Palmyra, perhaps, even more than to the Cocoanut, applies the distinction, which, with the discriminating eye of a poetess, Miss Jewsbury so instantaneously seized and so beautifully expressed, describing the Palms as

———trees not fair in woods
But singly seen, and seen afar;
When sunlight pours his yellow floods—
A Column, and its crown *a star*!

But in the fruit season, when the fires and torches of the nightly watchers, reveal by fitful gleams the thousands of tall and slender stems amid which they burn, even the Palmyra groves become invested with a sense of mysterious beauty, such as attaches to a temple, with light and shade alternating amidst its numerous columns and high arches.

Generally before the fruits ripen certain periodical showers are expected to fall in Jaffna, which are called "the Palmyra Rains" as they very seldom fail at the time they are expected.—Forbes's idea in his Oriental Memoirs, of Birds carrying away Palmyra fruits, reminds one of the bird in the Arabian Nights, the said fruits being as large as a child's head and about as heavy! but in Jaffna at the Palmyra season, Elephants cross from the main land at Elephant Pass and elsewhere, and come up thro' parts of the Peninsula to eat the ripe fruits that fall, and often to pull down small Palmyra trees for the sake of their fruits or tender leaves.—In this way the Palmyra fruits are scattered thro' the Jungles and get sown in great numbers.

It is stated that the Dutch by clearing away the Jungle from the roots of Palmyra groves, brought trees into bearing many years earlier than would have been the case had the under growth been permitted to choke them, excluding the light and air, which are as necessary to the well-being of this tree as that of any other.

The roots of the Palmyra tree are innumerable and composed of black divisions penetrating deep into the ground, and also for several feet on each side of the tree.—The upper part of the stem, from which these radiate, is in many trees exposed; and then some short rootlets may be seen growing above ground.

The Palmyra tree seems to grow in any soil, for close to the famous springs at Kirimalle in Jaffna, they seem to flourish on hard "Mackie" or Limestone rock, while a loose, and, but for their existence, barren sandy plain is their delight.

There are perhaps hundreds of persons in Colombo that never saw a Palmyra tree, although there are numbers of those Palms in the direction of Mutwall growing amongst the Cocoanut trees; and indeed I never could see the truth of Rumphius' remark that the two trees cherish such enmity to each other. On the contrary they seem to grow together on the most friendly terms, the one not appearing to affect the growth of the other in the least.—Large quantities of Red Sand are often in the tops of the Palmyra trees at Jaffna, and the supposition has been hazarded that this sand and much of the silicious soil of Jaffna, generally, has been wafted across from the opposite

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continent of India! The difficulty has been to reconcile the existence of soil so very silicious on a base so eminently calcareous, as is constituted by the coral and shell formations of the Northern Peninsula and Islands.

Mr. Winslow's description of the Timber is very correct, for when pieces of the wood are severely bruised, or when they become partly rotten, bundles of separate wiry fibres will be seen, having a soft fecula amongst them: these indeed, can be separated entirely from the fecula, in soft wood.—

The sound which indicates the fall of a Cocoanut, conveys correctly the idea of a violent rebound—the fruits roll to a great distance and are sometimes found with difficulty—their substance, when ripe, being a dry fibre with a degree of hollowess inside the Kernel. Easily distinguished from this is the dead, dull, plump of the rich soft Palmyra Fruits; and they generally lie where they fall, very seldom beyond 6 or 7 feet from the root, round which small circles of leaves, spadices &c. are often put as the owner's limits to his tree. In this respect there is never much difficulty in knowing to whom the fruits belong when two properties adjoin each other. The Cocoanut on the contrary, has got a bad habit of leaning over walls and fences, depositing its fruits in a different enclosure to that from which its root derives nourishment. This too, frequently involves disputes and law-suits, in the course of which some of the nicest points of "Country Law" are often raised. A fruitful source also, of bad blood and litigation, is the Jaffna custom of giving Palmyra Lands in Otty; that is raising a loan, and mortgaging the land for a series of years, the conditions of the bond being that the Mortagee shall, for the term agreed on, take the produce by way of interest. When the period expires either the otty deed is withheld, or the owner of the lands claims compensation for trees cut down.

The sight of a tall solitary Palmyra tree in full bearing, with its ripe gold colored fruits is perhaps one of the most remarkable objects in Indian vegetation.—

The Babylonians were the first to discover the difference between the sexes of the Date trees, and in those countries where they abound an invading enemy could not commit a greater injury than to cut down the Male trees; a practice which the passage quoted from Deut: reprobates; but on an occasion of this kind it is stated the invaded were known to collect the Pollen of the Male trees and keep it in close vessels for a period of 19 years, and with which they impregnated the fruit trees until the young Males grew up.— It does not appear from any traditions within our reach that this refinement in wickedness and cruelty was ever practised in Indian warfare.—By nearly every person who has not visited the Northern Province, or who has not taken the trouble to open his eyes for himself, the Palmyra is confounded with the Kittool or Jaggery tree, (*Caryota urens*) The Dutch called the Palmyra tree the *Jager Boom*, and it was this which perhaps induced a gentleman who once read a description of some trees before the C. B. Asiatic Society, after describing the Kittool, to state emphatically "this is the Palmyra tree of Jaffna"!! and we find one of the latest writers on Ceylon, *Mr. Pridham*, stating that a timber was got in Patchelapalle which was found nowhere else, and called "*Jager's Wood*"!!!—From the various girths given it will be seen that 2 feet at the root and about 1 in the middle is the average diameter

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of Palmira trees: Mr. Malcolm's tree of 3 or 4 feet in diameter would be worth travelling some distance to see.

Robinson in his Researches in Palestine states that *Doum* or *Dôm* is properly the Arabic name for both the Palm *Hyphœne coriacea*, and the *Zyzyplus Jujuba, or Illanda* of the Singhalese, so common in Ceylon. May not the *Jujabe* Gum, got from the latter tree, have been confounded with Bdellium, the tree again with the Palm of the same name, and that again with *Borassus flabelliformis* (as is known to be the case) and this in its turn so confidently said to produce *Bdellium?*—In the Laws of Menu, Palmyra trees are mentioned as proper to be planted in boundaries of lands.

The Proverb about the Palmyra Grove Fox not being frightened by the rustling of leaves is characteristic; for the peculiar, dry, rustling noise made by Palmyra leaves in the strong winds is very great, as the writer experienced when surveying amongst them. Often, at first, would he start, imagining that some large animal was rushing through the Jungle, until he became familiar with the noise of the leaves overhead.—The nuts (after they have given Kenlingoos) are charred, and are universally used by the Black-Smiths in Jaffna instead of Coals.

Vyramuttu's account:—A Varago Lacham is the 1/16th part of an Acre; then if 648 be planted to a Lacham, 10,368 will be the number in an Acre!

[*I take the opportunity of introducing here Major Forbes's notice of Olah Books, leaves &c; merely referred to, instead of being quoted, as it ought to have been, in the Appendix. Editor*]

"The Cingalese written character is particularly neat; and it is wonderful with what expedition a practised native writer proceeds with his work, and how straight he preserves the lines, although he has no support for the leaf except his left hand. Cingalese writings were always executed on leaves of the palmyra or tala trees: the former, being narrow, were used for ordinary messages and common deeds; but the talapat was always employed for books of value. The leaves of a handsome Cingalese book are about two and a half inches in breadth, and twenty inches in length: they are placed between boards of the same size, neatly lackered, and the whole is connected together by being strung on a cord; to receive which the leaves and boards are perforated with two holes in the middle of the leaf, and four inches from each end. The Cingalese writing is performed with a long, sharp-pointed style, by which the leaf is scratched or graved; and, to any person unaccustomed to the operation, it is even difficult to see the letters after they are formed: the whole is then made visible by rubbing over the leaf with a strong-scented, dark-coloured oil, prepared from charred gum; when this is again wiped off, the indented letters only are left black. The imperishable nature of the tala-leaf, and the properties of the oil used in blackening the writing, which is a preservative from the attack of insects, are the reasons why native books may be found of very great age, and in good preservation."

Postscript by the Editor.

Just as I am printing off the last pages of this work, I have received from P. A. Dyke, Esq., the very able Government Agent

of the Northern Province, the following information, which appears all that was necessary to render this account of the Palmyra complete. Amongst the other conclusions established by the Table of Exports, is, the futility of Bertolacci's fears as to the result of lowering the enormous export duty on Palmyra Timber which existed in his day. In the Customs Returns appended to his work, the quantities are not given; but, allowing for the difference of value in the Rix Dollar at that period, I find that the average Customs valuation of Rafters and Reepers (laths) exported in the 8 years from 1806 to 1813, was between £6,000 to £7,000 Sterling yearly. Nearly half a Century further on, the value of the Timber exported remains as nearly as possible the same. If we knew the number of trees exported in his time we should probably find that it has not materially varied, but that it has increased merely with the increased cultivation. For the ten years shewn in Mr. Dyke's Return, the calculation can be made by taking 5 Rafters or 15 Reepers as the equivalents of a whole tree. It thus appears that for export beyond seas, about 75,000 Palmyra trees are annually felled in the Peninsula of Jaffna. Those taken for home use and exported coastwise, will no doubt raise the total number to 80,000. So that to keep up the supply, and allow for accidents and failures, from 200,000 to 300,000 nuts should be every year put into the ground at Jaffna. The Timber, Jaggery, and other products of the Palmyra Tree, annually exported and valued on the spot at from £7,000, to £8,000, probably realize at Madras, Pondicherry, Tranquebar, and other Ports of Southern Indian, something like £15,000 to £20,000; thus enabling the people of Jaffna to purchase and introduce large quantities Paddy and Rice, their own production of which suffices only for about 3 months' consumption in each year.—Jaggery, it will be observed, the general average of which for 9 years had been about 4,000 Cwts., made a sudden spring last year, the export beyond seas having doubled; besides which a considerable quantity was sent Coastwise to Colombo and other Ports. Adding the two quantities together we have a total of 13,305 Cwts. and if we allow that each man, woman, and child in the Peninsula consumes 2℔ of Jaggery in the year:

$$\begin{array}{r} 250{,}000 \\ 2 \\ \hline 500{,}000 \text{℔s.} = \text{say, } 4{,}500 \text{ Cwt.} \end{array}$$

The total quantity of Jaggery prepared will be, about 20,000 Cwt. in round numbers.

The increase in the Population shewn by Mr. Dyke will of course slightly affect the calculation elsewhere made as to the number of trees for each individual.

The value of Palmyra Products exported beyond Seas and Coast-

wise, for 1849, added together, give a total of nearly £10,000. Add to this the estimated Value of Products consumed on the spot, and the total annual value of the products of these useful trees will, at Jaffna, amount to about £20,000.

MR. DYKE'S LETTER, ACCOMPANYING CUSTOMS RETURNS.

DEAR SIR, *Jaffna; June* 30: 1850.

I forward now all that I have been able to obtain from the Custom House relative to the export of Palmiras. Coastwise Returns not required to be rendered to any superior authority, under the present system, are not regularly kept up.

There are not any returns to shew what you require as to the No. of trees,* and I have not been able to command the leisure necessary to enable me to afford any satisfactory reply to your various queries.

Only as to the population of the Peninsula, I can state that by a Census taken with much care in 1839, it has hitherto (the Peninsula) been taken at 220,000; but the Returns under the Road Ordinance, the accuracy of which to a great extent has been proved by results, seem to shew that it is now considerably more, at least I think 250,000.

On the subject generally of the export of the Timber, I may observe, that I do not think that Palmiras are ever treated as a property to be made the most of by sale of the timber from time to time. A certain quantity of the wood for export is supplied by worn out trees, and the rest I conceive by what I may term casualties: as the felling of a few trees in a tope; to meet a pressing demand for a few Rix Dollars; the more reckless proceedings of the spendthrift and involved, in the entire clearing off of a tope; and by the operation, constantly in progress, to a considerable extent, of the changes made in the uses to which land is applied, whereby many lands in which the Palmyras are but thinly scattered are entirely cleared of them and planted with Cocoanuts, (a substitution of late years carried to a great extent); or brought under culture from Wells.

I remain, Dear Sir, Yours faithfully,

P. A. DYKE.

* I had asked Mr. Dyke if he was in possession of any estimate of the total number of Palmyra trees in the Peninsula and Islands.

Articles the produce or manufacture of the Palmyra Tree, exported beyond Seas from Ports in the NORTHERN PROVINCE.

YEAR.	ARTICLES.	QUANTITIES.	VALUE.
1840	Rafters..........No.	270,722 ..	6828 1 6¾
	Reepers (laths).... ,,	553,364 ..	1934 17 0
	Jaggery ....Cwt.	3847 2 8 ..	599 1 4¾
	Other Products	......	56 1 2¼
		£	9418 1 1¾

CUSTOMS RETURNS: EXPORT OF PALMYRA PRODUCE.

Year.	Articles.	Quantities.	Value.
1841	Rafters..........No.	254,682 ..	4275 17 10¾
	Reepers.......... „	148,432 ..	1614 10 1¼
	Jaggery ....Cwt.	5184 2 3½ ..	813 10 2¼
	Other Products	......	112 16 6
		£	6816 14 8¼
1842	Rafters..........No.	197,628 ..	4699 15 2
	Reepers.......... „	405,817 ..	1350 5 1¾
	Jaggery ....Cwt.	6595 3 16½..	991 10 6¾
	Other Products	......	68 15 6
		£	7110 6 4½
1843	Rafters..........No.	201,114 ..	4619 18 5¾
	Reepers.......... „	546,192 ..	1669 18 1
	Jaggery ....Cwt.	3628 2 1½ ..	645 18 0
	Other Products	......	58 6 4
		£	6994 0 10¾
1844	Rafters..........No.	254,066 ..	6205 0 10½
	Reepers.......... „	525,839 ..	1620 13 1¼
	Jaggery ....Cwt.	5177 2 20 ..	867 16 11½
	Other Products	......	46 9 2¼
		£	8740 0 1½
1845	Rafters..........No.	250,406 ..	6169 8 6½
	Reepers.......... „	448,493 ..	1435 17 9¾
	Jaggery ....Cwt.	3663 3 11 ..	732 18 9
	Other Products	......	50 11 6¼
		£	8386 16 7½
1846	Rafters..........No.	212,315 ..	5316 7 2
	Reepers.......... „	525,842 ..	1715 14 8
	Jaggery ....Cwt.	3607 3 17½..	834 18 3
	Other Products	......	37 9 3
		£	7904 9 4

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CUSTOMS RETURNS: EXPORT OF PALMYRA PRODUCE

Year.	Articles.	Quantities.	Value.
1847	Rafters ....No.	192,098 ..	4717 9 6
	Reepers........... „	420,070 ..	1362 0 8
	Jaggery ....Cwt.	4662 1 26 ..	1051 9 2
	Other Products	......	33 10 9
		£	7164 10 1
1848	Rafters...........No.	206,707 ..	4881 15 2
	Reepers......... „	380,183 ..	1108 10 0
	Jaggery ....Cwt.	4467 3 ½ ..	924 1 4
	Other Products	......	67 14 4
		£	6982 0 10
1849	Rafters...........No.	195,980 ..	4736 8 6
	Reepers.......... „	418,690 ..	1188 2 4
	Jaggery ....Cwt.	9580 2 10 ..	1937 13 9
	Other Products	......	39 4 7
		£	7901 9 2

Detailed Account of Articles the produce and manufacture of the Palmyra Tree, exported both beyond the Seas and Coast-wise, from Ports in the NORTHERN PROVINCE, for the Year ended 5th January 1850.

	Beyond Seas.		Coastwise.	
Articles.	Quantity.	Value.	Quantity.	Value.
Rafters ....No.	195,980...	4736 8 6	7,905 ...	280 2 6
Reepers......... „	418,690...	1188 2 4	8,183 ...	34 7 6
Well Whips... „	3 ...	0 9 2	... ...	... ...
Jaggery ......Cwt.	9580 2 10	1937 13 9	3625 0 25	922 3 0
Winnows ......No.	1212 ...	2 19 1	16,677 ...	28 6 11
Fans .... „	... ...	... ...	91 ...	0 12 0
Baskets......... „	150 ...	2 6	82,293 ...	193 16 4
Bags .... „	... ...	... ...	511 ...	2 1 0
Mats .... „	998 ...	11 15 5	42,637 ...	211 5 1
Prepared leaves ...	297,008...	6 11 2	108,960 ...	6 7 6
Ponatto ......Cwt.	115 3 10	15 3 9	385 2 20	92 11 7
		£ 7901 9 2		£ 1771 13 5

APPENDIX.

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Contents of the Appendix.

Any deficiency in the body of this work will we found amply compensated for in the copious and varied contents of the Appendix. It opens with a very curious and truly oriental production, now translated and published I believe for the first time. The translation has been made expressly for this work, by a Tamil Native educated under the American Missionaries at Jaffna. I have seen an abstract of the Poem by Simon Cassie Chitty, Esq., which differs in some respects from the one here printed. To Mr. Cassie Chitty am I indebted for the information, that the Poem was written by "Arunàchalam, a Poet of Terrukkudantei, the same with Combaconam in the Province of Tanjore." While the Translation made for me represents the Poem as addressed to a Female who resembles Lacshimi, Mr. Cassie Chitty understands it as addressed to the goddess of Prosperity herself. While Mr. C. Chitty also literally understands the Poem as descriptive of the 801 uses of the Palmyra, the Jaffna Translator has probably seized the true intention of the author, who, in the spirit of eastern hyperbole, represents his long and laboured production as setting forth only the 800th part of the uses to which the theme of his verses, "the Kalpa-tree of the earth", can be applied. Some of the poetical imagery is very beautiful. For instance where uncertainty and distress are represented by the trembling drops of water on the floating lotus-leaf. The low and material view of the Hindoo deities, here taken, ought to make Christians thankful for the light of the Bible. The "Preserver" and even the "Creator" are represented as displaying signs of the most abject terror at the rebuke of the "Destroyer"—replying to his threats "trembling, in faltering language and with fingers under the underlip." Any person who has seen an Asiatic of the lowest caste listening to the commands of a member of the higher, will understand the full import of such language. Ganessa, who is invoked at the commencement of the Poem and noticed as the special protector of Palmyra-culture, is the Elephant-headed god, worshipped at Jaffna under the name of Puliar. He is the son of Siva, the Destroyer.

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Each of the Proverbs, quoted from Mr. Percival's interesting volume, is preceded by a heading, in which it is attempted to indicate the meaning, or the equivalent in English. To Mr. Percival I am indebted for the information that the word *Thalu* in Tamil or Sanscrit is synonymous with the English word *Palm*—a general term in fact for all Palms.

The account of the Palmyra by Mr. E. Cornelius, a native of Jaffna, educated at Batticotta and now employed in the Surveyor General's Office at Colombo, is full and interesting. It was written at my request so far back as 1844.

The next Paper is a literal translation from the original Tamil of a Point Pedro Merchant, a man of much intelligence and respectability. Persons who have lived any time in Ceylon and who have seen Native Petitions, will be familiar with the term "pass our days", as indicating the possession of or desire for the means of barely supporting existence. Thus the Palmyra enables many of the poor people of Jaffna to "pass their days."

The account by the Rev. Mr. Roberts is graphic, but the writer has fallen into the strange mistake of talking of "Chunam" as an agent to produce fermentation. The native maker of Jaggery, like the Scientific Sugar Boiler knows that Lime is necessary to prevent fermentation in the Saccharine juice. Those who have once tasted the highly-limed Toddy intended for Jaggery, will not be ready to repeat the experiment.

The only error in Cordiner's description is corrected by Bertolacci, who states that Palmyra Toddy is inferior instead of superior to Cocoanut Juice, for the distillation of Arrack.

Bertolacci, imbued with the narrow commercial spirit of his day, considered an export duty of 25 per cent. on Palmyras, necessary, not only for revenue purposes, but to prevent the natives from committing the suicidal act of cutting down the trees on which to such an extent they depended for food! People now-a-days have learned that human nature is influenced by the same great actuating principles every where, and that the Asiatic is no more likely recklessly to cut his Palmyra, than the Englishman is to place his Cherry trees at the disposal of the Cabinet-maker. The duty was reduced to 2½ per cent. and finally, in 1848, it was altogether abolished, but for 30 years the export of Palmyra Timber has remained as nearly as possible stationary.

Mr. Winslow's account shews how, from this tree and its products, the native can construct a house,—store his grain,—make his bed,—furnish his provisions,—kindle his fire,—draw or bring his water, and (by the aid only of an earthen pot,) cook his food,—sweeten it if he chooses,—procure wine, and live from day to day dependant on this single tree. The writer may well call it the Bread Tree of Jaffna.

Bennett notices the fact, that in the time of the Dutch, Palmyra

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Flour was sent to the Cape and Holland to be used like Sago as "a convalescent diet"; while he shows that from the Palmyra, like the Cocoanut tree, a downy substance is obtained, used by the Native Doctors to staunch blood.

The extract from Mrs. Tucker's graceful sketches of Southern India, and that from Dr. Duff's Speech, are deeply interesting, as descriptive of the great Palmyra region of Southern India, whence is obtained the chief portion of the raw material from which the Palm Sugar manufactured at Cuddalore and Pondicherry is procured.

Mr. Cryer's article on the united Banyan and Palmyra has been already alluded to; and the several succeeding articles on Palmyras and Palm Sugar, especially that from Chambers' Journal, will be found very interesting.

Ainslie supplies interesting remarks on Toddy, Bdellium, Jaggery, &c. Fresh Toddy, he shews, may be used medicinally in certain cases. The extract from Eastern Arts and Antiquities supports the view that Palm Leaves were amongst the earliest substances written on.

Crawfurd notices a corruption, giving rise, in Java, to *Lontar* as the name of the Palmyra, similar to one which has induced Englishmen in Ceylon to talk of the *Tallipot* tree—the derivation, being from *Tala* the Tree, and *pat* leaf.—The extract from Malcolm shews that the Palmyra covers large portions of the Burman empire.

My work is enriched by a Translation of an elaborate notice of the Palmyra by the venerable and justly esteemed Rumphius. For this translation, and for much valuable assistance in the same direction, I am indebted to Mr. C. A. Lorenz. Mr. Lee was good enough to look over a portion of the translation and to make a few corrections. The "observation" at the end is by the younger Herman, and the account is followed up by Dr. Buchanan Hamilton's Commentary The extreme correctness of the Dutch Governor, on all the main points, is astonishing, considering the means thro' which he procured his information There appears, however, to be no foundation for the distinction he makes between wild and domestic trees.

Amongst a series of short extracts which follow, will be found one from Percival's Work, embodying the oft-repeated error, that Toddy is obtained by incision from the body of the tree.

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(Translated expressly for this work)

TALA VILASAM.—ON THE PALMYRA TREE.

INVOCATION TO GANESA.

I invoke Genesa to help in my composition of the work on the Palmira-tree, in the species of poetry called Kali Venpa, and in presenting the same to the people on the sea-girt earth.

O thou lady, resembling Laksimy who is seated on the beautiful red lotus! thou of sweet expressions whose breasts are under stays, and whose person resembles a peacock! hear me tell you in brief an account of one out of the eight hundred items of things connected with the Palmira-tree, which is emphatically the Kalpa-tree* of the earth. The various productions of earth created by Brahma came short of men's wants; and there was wanting one substance, which had an entire power of assuaging hunger, removing disease, feeding the illiterate and enriching the house; and therefore the people of the earth were as unfixed (in all their worldly prospects) as the water on the leaf of a lotus, made Poojas and prayed to Sivan for assistance; Sivan heard their prayers and asked of Vishnu with displeasure the reason of his not having daily attended to his duty of preservation? To which Vishnu, in great obeisance, with one arm folded and the fingers of the other put upon his under-lip—replied, there is no fault in my course of duty, but the present amount of things created on the earth by Brahma is insufficient. Upon which, Sivan, in great displeasure and anger, looked at Brahma and asked of him the reason of his not having created things to satisfy all the wants of the people of the earth. Brahma trembled and perspired (through fear) and putting his fingers under his underlip (as a sign of great respect to a superior) and in faltering language, replied, My Lord, who is the operative cause and immaculate! What I have already created is all that I knew. Parvathi (Sivan's consort) then said to Sivan, there is fault neither in Vishnu nor in Brahma, and thus appeased his anger. Sivan, upon this, after meditating in his own mind, said to Brahma, hear me tell you something to supply the wants of the people of the Earth. Create the Kalpa tree upon the earth also. At the direction of the crescent-moon-adorned Sivan, Brahma created in abundance Palmira-trees in the three countries of Panathar, Panyoor, and Panangasdoor, and called Palmira-trees by the names of Pootpady, Ponthy, Panay, and Talam. Let me now tell you the various produce and use of the Palmira, much extolled by the people of the earth. If you carefully turn up the ground by hoeing, hedge it and bury Palmira-stones in rows at the distance of eight spans one stone from the other, they will return favour, and will never fail, just as the renown of the wise of spiritual blessing will not. When the stones sprout and become tender plants, if you take good care of them not to let the goat, sheep, cow and wild cow feed upon the plants, they will grow in strength, and with the swords of their stems, armed with indented jags on both their sides, they will destroy the iron age of poverty and protect the earth. When the Palmira tree grows to the height of two bones length, the roots of the stems that fastened the tree will get dry and fall off in season. A female child and a Palmira tree, if carefully nur-

* The Kalpa-tree is one of the five fabled trees of the world of Indra noted for its liberality; grants to any body who goes to it whatever he is in need of; is the tree of life in Paradise.

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tured, will become fruitful in their tenth year. The principle of the blossom (of the Palmira-tree) developes itself during the months of November, and December; the blossom shoots forth as hoarded treasure for time of exigency in the months of January and February; and then the tender fruits are formed; and of these tender fruits, some do fall from the trees out of season. People collect and cut them to pieces, and give them to the cows to eat. Sins may thus be removed, and the cows will give plenty of milk. When the tender fruits of the trees have become larger, they are some of them separated from the trees, the integuments and the adjacent parts are pared off, and the pulpy kernel within is drunk by the people. The drink will remove various diseases, *simulque supprimet vires gonorrheæ.* Had the celestials and the anti-celestials ever tasted of the pulpy kernel, they would never have gone to churn the milky occean. When the fruits approach towards ripening, they are some of them separated out of the trees, laid in the sun for a while, the pulp is then pared and boiled in cocoanut-milk mixed with the husked seeds of pulse, and is then eaten. When the fruits have become well ripened, they fall from the trees, give an agreeable odour; the integument is severed, the fruit is then roasted in fire, washed in pure water and the skin is peeled off; press the fruits with the hands and swallow the pulp of it; even honey, milk, and sugar will not resemble the pulp in sweetness: the fruits may also be sprinkled with reserved Palmira-pulp-water and then be used. Also the pulp is expressed, mixed with rice flour, boiled in oil or ghee, and then used as sweet-cakes. The Pandal is made in a suitable place, and a certain spot near the Pandal is nicely daubed with cow-dung. Poojah is offered to Ganesa, his aid is implored, and then the ripe fruits are washed in water, broken by beating with a wooden mallet, and the skin is peeled off; the fruits are then put in Kadaca-baskets, reserved Palmira-pulp-water is poured in, well pressed with the hands; the stones are carefully expressed, and put in another Kadaca basket and undergo a similar process a second time; the stones are then thrown out in a heap, the fibres of the fruits that lie blended with the expressed pulp are carefully separated by a brush, made of the twigs of certain shrubs; the pulp is then poured upon a mat of about twelve cubits long which is spread on a Pandal; well spread over the surface of the mat, and left to dry in the sun during the day time; in the evening the mat is folded, in the following morning it is unfolded. The above mentioned prbcess is continued for about eight days, and when the pulp has become well dried and an inch deep, salt and pieces of Perandi-shrub are sprinkled over, lines are drawn with weed hook (or sickle), or a like instrument, at the distance of a span from one another, the dry pulp is pared off from the mat, and then left to dry for a day more in the sun; the square pieces of dried pulp are then folded, put in a Kooday-basket and laid over a Paran-shelf, to be smoked and to serve for future use.

Hear me, O Lady, the process of dried pulp which a rich man would use. In the pulp expressed from good edible Palmira-fruits, powder of Palmira-jaggry, and ghee are put, and the pulp is then as before spread over the mat, and when the dried pulp gets half an inch deep, it is as before pared off, and reserved for time of want. Another process of preserving dried Palmira-pulp is the following: the dried Palmira-pulp is cut into small pieces and steeped in Palmira molasses, mixed with roasted powder of pepper, sessamum seeds, rice, and cummin; preserved in an earthen pot, the mouth of the pot is well luted, and then these sweet cakes are used by the country people in their feasts. Hear me again: the pulp that is expressed out of the Palmira fruits that fall scantily in the latter part of the fruit season, is spread over the mat for two days and left to dry very well; the dried pulp is then peeled off into sheets. An offering of Cakes made of the flour of the

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edible Palmira-roots and of dried Palmira pulp, together with other fruits, is made in Palmira plantations to Ganesa. The dried Palmira-pulp that was preserved is protected without contracting grubs that may spoil it, if the owners are devoted to Ganesa during the time. The dried Palmira pulp that is thus preserved may better serve the people as food during the rainy season. Griping of the bowels, diarrhœa and lodging of small fish bones in the esophagus may be removed by eating dried Palmira pulp. The stones of the Palmira fruits that are eaten, and of those that are expressed, are divided into four sorts, put in the ground into beds of 4, 5, 6, or 8 layers, covered with earth, watered twice during the months of August and September, and the edible Palmira-roots are dug out in the months of January and February. When there is no rain the skin of the root is peeled off, its head is pared away, the root is cloven into halves, its foot is nipped out, left to dry in the sun, the foot is nipped off in the second and third also, the halves are carefully stirred up to dry well, and then collected and preserved. Such dried edible Palmira roots are powdered and sifted, salt water is sprinkled upon the flour, fish, herbs, and other fruits are added to it and mixed together, the paste is then put into a conical Ola basket, and steamed ; the poor people eat much of it and get strength.

If the flour of the dried edible Palmira-root * be mixed with Cocoanut milk, salt water and fish, and if the paste be steamed, the cake when eaten, will daily add strength to any body. The middle pieces of the Odial are cleared of their outer fibrous skin, soaked in water, then dried and powdered ; if the flour be mixed with the Cocoanut milk, salt water, fish and herbs, and if the paste be steamed and then ghee be added to it, the cake will indeed be very sweet ; if certain fruits and pungent substances be added to the above, the cake will be of an agreeable taste. If the Odial flour be mixed with the scrapings of the kernel of the Cocoanut, and powdered rice, cummin, pepper, and chilly ; if the paste be steamed and the cake be broken and dried, it can be preserved for two months No other cakes will resemble the above. Sweets are more agreeable to cakes of the above description. If curds, milk, ghee, and Cocoanut milk be added to the paste of the Odial flour, and be steamed, the cake, when used, has the power of *retinendi seminis virilis in corpore sine pollutione* ; *conferendique facultatem horas in thalamo jugali protrahere*, and increasing muscular strength ; the person will not be reduced by labour. I shall now tell you, Lady, of the different kinds of gruel made of the Odial flour: in the boiling water in which fish, chillies, lobsters, acid, grits of rice, have previously been put, in proportion, by little quantities, the Odial flour ; stir it, and when it gets boiled and reaches a proper consistency, take the vessel out of the hearth and use it ; if certain healthful (i. e, that contributes to the improvement of one's health) fruits be added to the above, any body may use it. If in water, salt and grits of rice and small fish be put first, and when they get boiled, if Odial flour, mixed with acid and powdered chillies, be poured in and properly stirred,—the gruel infused, will be a very healthful one ; if herbs and certain fruits be added to the above, the gruel will be a very good one. The people, when they dig the edible Palmira roots, take some of them and roast in the fire, remove the outer covering and then eat the roots by mastication. If the roasted roots be exposed to the dew and be eaten on the following morning, it will be very nice indeed. The edible Palmira roots are boiled by steam in water and eaten ; also such boiled roots are like the Odial mentioned before, dried in the sun and preserved for future use. The accompaniments that are to be taken with roasted and boiled edible Palmira roots, are, Cocoanut, salt, and pungent substances.

People may eat the sprout that just shoots forth out of the Palmira stone ; the stone, in a certain stage, may be roasted in the fire, then be broken and the kernel be

* Dried edible Palmira roots are called Odial.

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eaten. There is no comparison to the curry or broth made of very tender edible Palmira roots and Cocoanut milk. The kernel that is formed in the Palmira stone in its advanced stage will be very sweet.

Hear me now tell you the use of the Palmira stone shell. It will ever serve as fuel for cooking; if the shell be partially burned and the inner coat of the shell be removed, it will serve as coals to smiths; it will also serve as a powder box, tinder box and a pill-vial.

When the Palmira tree puts forth blossom, it is rendered fit for yielding the juice by pressing it between two poles, and by beating it with the handle of a knife; its end is properly incised, a vessel is adjusted to it, and toddy is collected; if the toddy be presented in Poojah to Sacti, excellent boons may be obtained. Toddy if drunk, *excitabit amorem et cupidinem in illis, qui in rem uxoriam incumbent.* If taken daily, it will increase one's muscular strength and give a gloss to his person; if used by children in small quantity it will remove itch and many other diseases. If powdered loadstone and scoria of iron and file be put into the pot that is attached to the incised blossom, and the toddy collected in such a pot be drunk for seven days in the morning,—asthmatic affections, bloated cheeks and the like, may, at once, be removed—If, in the morning and evening, the pot that should be attached to the blossom be baked in fire, *qui succum in hac olla collectum bibet, diutius in copulatione morabitur.* If shell-lime be put in the pot that should be attached to the blossom, and the toddy be used, hunger, thirst, languor, and laziness will be removed; heat in the constitution will be destroyed and coolness be created. Toddy will be very sweet if powdered pepper be put in it and boiled. If toddy be boiled nicely, and if slices of ash-colored pumpkin be boiled in it,—the broth, when it is seasoned and used, will create a wonderful power to the stomach to digest any amount of food. If, when the south-wind blows, toddy be collected, strained and poured in a pot, and be boiled until it gets the consistency and colour of Margosa-oil—then be poured either in a new pot or a vessel of Palmira leaf, the mouth well covered, and the vessel be then exposed to smoke or buried in the earth—the Palmira mollasses will be candied (i. e,) crystalized : these crystals, if taken into the mouth, will suppress asthma and phlegm.

If the boiled toddy in the above process be still boiled until it sticks a little to the bottom of the vessel and bubbles are formed, you can have Palmira sugar.

If toddy be so boiled that, if it be taken in a ladle, it will not be drawn into threads, but will break,—take it out of the fire, put a little quantity of rice flour and mix it well with the mollasses and pour the mollasses in pots and little Ola cases; you will have Palmira Jaggry:

If, in the above said stage of consistency, powdered cummin, pepper, and sessamum seeds all well roasted be put in the mollasses; and if you steadily continue mixing and agitating the mollasses, you will have a powder, which may be used to assuage thirst; such a powder, if it be of the toddy of a male Palmira tree, may be taken as medical accompaniments; may also be given to motherless babes. If the proper consistency be not pitched, it will get as hard as Sugar-Candy.

When Toddy ceases to be drawn by the close of March, there will be fruits during the following five months, and during the remaining months, there will be dried Palmira pulp. So, the produce of the Palmira tree is had in every month of the year, and the edible Palmira-root can be had in all the months of the year. The Palmira-tree is able to bestow bountifully, and one may eat of its produce in the three seasons of meal every day. The mind will ever love it more than any other thing. If a person only with gratitude to the tree eat of its produce twice or more a day, he will have all the benefits of those that spend the day in fasting and devotion, and eat only once a day.

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Old Palmira branches are cut out of the tree every other year, left to dry in the sun a day, made flat by pressing them in a certain manner, and then used for covering and fencing. When the Olahs get mouldered, they are used for manuring rice fields &c. The inner fibrous bark of the Palmira stem is used in making cords and ropes, &c. but the outer bark is not so strong as the inner. The Palmira stem is used in making cots, hedging, and covering an ola book. The white tender Palmira leaves are used for making baskets of several kinds, as for storing Paddy, for keeping cloths, betels and arecanuts, sacred ashes and other things, for measuring grain, oil and the like, for making cases of several species, for drawing water, and for making mats of different kinds. The ribs of the Palmira Olas are used for making cords and ropes, winnowing baskets, and brooms &c. The tender Palmira leaves are used for making umbrellas, fans, dolls, vessels to eat from, and rolls for the perforated ears.

The Olahs are used in writing the Veds, Shasters, and Agamas, in making deeds, conveyances, dowries, and other presents, in writing interest bonds, in drawing magic diagrams, in writing letters to friends at a distance, in drawing accounts.

The names of Palmira trees are numberless, such as, the white, the tall, the short, the black-fruited, &c. The roots of Palmira branches that attach themselves to the tree, and the webs that lie interwoven between them, fall off in season, and may be used as fuel. If the several ingredients of the male Palmira tree be all collected, rubbed into a paste and mixed with cow-milk, *et si aliquis, qui vult cum fœmina rem habere, hoc bibet, ille tempus copulationis protrahere poterit.* The tender pith of the Palmira tree that lies in the top part of the tree is eaten by the people.

The timber of the tree is used for building temples, palaces, houses, alms-houses and inns; also as wall-plates, beams, posts, door-frames, pegs, laths and the like. The stump of the tree may be made hollow and used for keeping salt. The produce of the tree may procure to some, fields, houses, and jewels. Peace of mind may be secured; one may live in prosperity and great renown. The Palmira stone, though boiled or roasted in fire, will still sprout; it is therefore of a superior quality.

The Pandava kings have regained their lost kingdom, because they have eaten Palmira fruits when in the wilderness. The Pandya King and others are said as having worn garlands of Palmira blossoms.

TAMIL PROVERBS REFERRING TO THE PALMYRA TREE.

[It seems natural that a tree so largely diffused over the regions where the Tamil Language is spoken, and which with its various products enters so largely into the daily use of the people of Southern India, should occupy a prominent place in their proverbial sayings and illustrations. Accordingly, in a Volume of Tamil Proverbs, published by the Revd. P. Percival of Jaffna, I find the following, borrowed more or less from this familiar palm and its characteristics:—]

Fibre used as Tooth Pick.—No. 128.—He whose father possesses a thousand Palmyra Trees, has not a fibre to pick his teeth.

Sharpness of the Leaf stem.—No. 480.—What he saw was a snake, but what bit him was the stem of a Palmyra Leaf.

Leaves young and old, illustrative of heirship and succession. No. 581.—It is said that the Young leaves of the Palmyra tree laughed because the dried leaves fell off.

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TAMIL PROVERBS.—PALMIRA AND ITS USES.

TENACITY WITH WHICH FRUIT CLINGS TO THE TREE.—No. 618.—Will the Palmyra fruit fall because a crow alights on the Tree?

SIZE AND WEIGHT OF THE FRUIT.—No. 720. Can Palmyra Fruit be suspended from the neck of a little bird?

TENDERNESS OF THE GERM—taking unnecessary trouble.—No. 760. Why use a mallet and wedge for splitting the newly germinated root of the Palmyra, that may be split by the hand?

HEIGHT OF ABSURDITY.—No. 1133—As the scorpion stung the Cocoanut Tree and the Palmyra swelled in consequence!

FELLED TIMBER—REMOVAL OF OBSTACLES.—No. 1312.—As an ass perambulated the place where Palmyra Timber had been felled.

FALLING FROM A PALMYRA TREE.—INJURING A FALLEN MAN.—No. 1315.—A snake bit him who had fallen from a Palmyra tree.

"YORKSHIRE THO' IN LONDON." No. 1342. The Fox of the Palmyra Tree is said to have deceived the Fox of the City.

AVOID EVEN THE APPEARANCE OF EVIL—TODDY-DRINKING DISCREDITABLE.—No. 1371.—Though you drink milk under a Palmyra Tree, it will be regarded as Toddy.

PALMYRA TREE INSUFFICIENT FOR SHADE.—No. 1372.—Is the shadow of the Palmyra Tree a shade, or is the friendship of the malignant friendship?

RUSTLING OF LEAVES—EFFECTS OF LONG EXPERIENCE.—No. 1380.—Will the fox of the Palmyra Grove be frightened by the rustling of leaves.

"TELL THAT TO THE MARINES!"—No. 1386.—As one ascended a Palmyra Tree and descended without touching the blossom!

TODDY—THE HABIT OF DRINKING CANNOT BE CONCEALED.—No. 1416. He who drinks milk will belch milk; and he who drinks Toddy will belch Toddy.

EATING A PALMYRA TREE—EFFECTS OF PERSEVERANCE. No. 1515. By eating slowly even a Palmyra tree may be eaten.

HOW THE FRUIT FALLS.—No. 1580.—The fruit of the Tree will fall at its foot.

YOUNG TREES:—TO SAVE YOUR PROPERTY YOU MUST TAKE CARE OF IT. No. 1677—Preserve young Palmirahs by cutting and Buffaloes by tying.

TURNING THE TREE TO A BAD USE.—No. 1698. Is it to drink Toddy after having reared the Palmyra Tree?

WITCHCRAFT AND BASKET-MAKING: EASY ARTS, No. 1759. Witchcraft is the easiest of all arts, and the common Ola Basket is the easiest of all plaits.

[The following is quoted merely by way of contrast. It would be as difficult to see a crooked Palmyra as a straight Cocoanut, or the young of the Heron at Jaffna where the bird is migratory:]

No. 795.—The young of the Heron has not been seen, nor a straight Cocoanut tree.

THE PALMYRA AND ITS USES.

By Mr. E. Cornelius, of Jaffna.

This species of Palm seems to be an indigenous production of Ceylon. It grows mostly in Jaffna. Its nut is of an oval form covered with bushy threads. About five months after its burial, which takes place in the months of August and September or thereabout, it thrusts downwards a root, which grows to the length of about a cubit, and which is eaten after toasting or boiling it on the

fire. To keep it for future use, it is dried in the sun, the web-like substance that covers the edible part having been scaled off. If this process is performed after it is boiled, it is called "Pooloocodial," and if before, "Odial." The latter is reduced to powder which is made into "Kool," a kind of pottage resembling Congee

Within the nut there shall now be seen a kernel fit for food in its natural state. The shell that covers the kernel is used for fuel, and is the only thing used in the smith's forge.

This root, when let alone, for about eight months, shoots out a leaf from about 12 or 13 inches long, and 1 or 1½ inch broad. The fifth or the sixth year's leaf assumes its perfect form, with a serrated stem which is crowned with the leaf, the ends of which stand separated, having the direction of their projection turned from the end of the stem, as the radii from the centre of a circle. In this state it is called Vadaly or young Palmyra. The trees are either males or females.— The latter alone bring forth fruit, and that not before they are 15 years old. In the months of November and December, the tree begins to produce Paly, the stem on which the fruits hang. Now the Nalavas and Pallas extract toddy, a liquor called Culloo or Toddy before lime is dissolved into it, and Carupaner or liquor sweet as Sugar Juice, after its dissolution. The liquor extracted from the male tree is sweeter than that from the female tree. Toddy and sweet Toddy are both used as beverage. Those who use the former except as medicine violate the rules of morality and temperance. The Sweet Toddy or liquor is simmered in the fire till it becomes slimy, and then it is poured in small boxes of Ola, and it becomes then fit for future use. This is called Palmyra Jaggery, and was used instead of Sugar and Sugar Candy, as in taking medicine, making Cakes and making up mortar, &c.

With its leaves, or olas, houses are covered, mats and baskets are woven, fans and umbrellas are made, gardens are fenced, and, above all, through these the oracles of heathen deities, Puranaos and Shastrans, are transmitted to posterity. As Paper is to the Europeans, so is the Ola to the Hindoos. After these leaves are rotten and decayed, they serve as soil to the fields. When they are fresh and green, they supply the place of straw to Cows and Oxen. The stem or "matty" of the leaf is very useful in fencing. The outer parts of the stem are peeled off and used in building instead of iron nails, and in many respects instead of cords. With the inner parts, composed of long fibres, are made cords; with the Eeku, a tendon-like substance which connects the different parts of an Ola, are made Eervanus or flat strings, and brooms

In the months of July, August and September this tree brings forth ripe fruits. Within the young fruit there are eyes, as they are called, full of sweet liquor and kernel.

Having taken in this liquor and kernel, the young fruit itself is cut into pieces and is eaten by Cows and Oxen. The same is done with the wind-falls. A fruit generally contains three or less nuts but rarely four or none. When the fruit is nearly ripe, the fleshy part is cut into long pieces and eaten having first boiled them in Cocoanut milk or in water. The ripe fruit is eaten either dipping it in Cady (a kind of vinegar-like fluid, prepared by decocting the refused parts of the fruit; such as rind, nut, &c.) or roasting it in the fire. In order to keep it for future use, take a number of fruits, peel off the rind, squeeze and press off the juice from the nuts in a basket of water, taking care to remove the threads that may fall in with the juice, and spread the juice upon a mat and expose it to the sun. After 15 layers are made, cut it into rectangular pieces with the tip of a knife, so slightly that you may not injure the mat, fold them separately,

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and place them in order one layer upon another, sprinkling salt water between every layer. These are called Panaddoo, sometimes a kind of jelly is made by cutting these into smaller pieces, adding spices, jaggery, &c.

The juice is sometimes kneaded with rice flour, and balls are made of it which are baked in oil in the Oven. These balls are called Panangkaipannikarans.

Having enumerated in short, the principal uses of the leaves and fruits of the Palmyra, I now descend to give a brief description and use of the body or trunk itself.

This tree grows to the height of from 40 to 60 feet, the female tree in particular is very hard and firm. The summit of the tree is decorated with the leaves. Around the trunk of a Young Palmyra, are seen the stumps of the stems, clinging till they are plucked off by men or beaten down by the wind or fall of the rain, which then are used as fuel. The Trunk is like an iron cylinder, the perimetre of whose base is about 6 feet and that of the top about 3. It is supposed to stand for about 1000 years after planted and lasts for the same after felled. In common proverb "a lac after planted and a lac after felled." With this trunk our houses are built. It is split into 2 or 3 pieces for beams and for rafters. As to durability, it stands as one of the first in this country. It is one of the commercial articles of exportation to Colombo and to the Continent. This tree grows in many parts of the Continent and Ceylon, but it is only in Jaffna, the use of which is known. There is nothing in this tree to awake one's laughter. It is the same as any other of God's creation. "They reject what they cannot enjoy," may be said of those who despise them that eat its fruit; there is not a particle of this tree that is without its use to man.

OF MAKING PALMIRAH PLANTATIONS, AND OF THEIR PRODUCE.

By Mr. A. Vyremootoo, of Point Pedro.

Palmirah nuts can be got from 40 to 80 for a penny—they are to be buried 4 feet asunder in one Latcham of Varrago culture, 648 Palmirah nuts to be buried, holes to be dug ¾ foot deep and the nuts to be buried, and after 3 years expired in the month of November the whole of the ground to be turned up—After 5 years, the bottom leaves of the plants to be cut once a year in October—If the nuts are buried in first sort soil, the plants will blossom from the 12th year—Palmirah trees will stand for about 500 years—After the 10th or 12th year the leaves of each tree to be cut once in 2 years, and can be sold at *1d.* the leaves of every tree—Fences to be properly put up around the 4 sides of the ground to prevent cattle from damaging the plant, and care be taken of them—Palmirah nuts might be planted in any sort of soil, whether it be sandy, rocky or garden soil, or in paddy fields; no cultivation of any kind is necessary to make them thrive—If planted in sandy or rocky ground, it will take long time for the plants to blossom—After they are blossomed, if sweet Toddy is extracted in male trees once a year in March, each tree will yield not less than *6d.* worth sweet Toddy; and if extracted in female Palmirah trees from March and continued for 3 months, each tree will yield from *6d* to *2s.* worth of sweet Toddy—Half the share of the sweet Toddy so extracted belongs to the Toddy drawers, and ½ belongs to the owners of the trees, and no other expense will be required—If a penny worth of sweet Toddy is put into a vessel and boiled it will get hard and harder; if poured into another vessel it will become Jaggry—if a penny worth of the said Toddy is boiled and made into

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VYREMOOTOO'S ACCOUNT.

Jaggry, it will weigh 3 lbs. and that quantity is sold here for two pence; and ½*d.* or ¾*d.* worth of firewood will be necessary to make the said quantity of Jaggry; the Palmirah tree itself (from which the sweet Toddy is extracted) will yield the firewood required. A little chunam is generally daubed inside the pots to make sweet Toddy; if not it will turn into Toddy—Toddy will not produce Jaggry, it will answer for persons who drink it—if they drink in excess it will make them intexicated—a pot of Toddy sold at ½ penny. Vinegar also is made out of it, and I think Arrack also can be made of it. If sweet is not extracted from the said Palmira tree, it will bear fruits so as to be worth from one penny to 8 pence in a year—Particularly a greater number of natives of Jaffna eat the said fruit and pass their days. —A Palmira fruit can be sold from ⅛*d.* to ¼*d.*—The Palmira fruits are squeezed, and the juice produced if daubed on an olah mat and exposed to the sun, will become (பனாட்டு) Pinattoo; people take good care of the said pinattoo, and make it as their food, and eat of it once a day, and keep the said pinattoo for one year—The Juice daubed on a mat when dry becomes pinattoo and can be sold from 3*s* to 6*s*; 500 fruits of 3 nuts will be sufficient to yield a sufficient quantity of Juice for a mat—after the Juice is extracted the nuts will be buried in the ground, and when 5 months are expired they will produce roots called Panem Kilenkoo—People use to eat the said roots after boiled, if the said Kilenkoos are boiled and exposed to the sun after being splitted, they will become dry, and then they are called Poolokodial; they can be preserved for a year—When people feel hunger they use to eat them just as they are, and refresh themselves, and some use to pound them into powder, and after having mixed cocoanut and jaggry with it, use to eat and refresh, and it will be very sweet—If the said Panemkilenkoos are splitted in two without being boiled and put in the sun to dry, they will become Odials, and they can be preserved for a year, and when people feel hunger or desirous, use to take 20 of them and pound, when it become flour, put little chilly and salt, and boil it until it become Pootloo (பிட்டு), and then eat it up. If sour is also mixed with the said flour and boiled, it will become (கூழ்), Kool; with the said Kool and Poottoo if fish or prawns of different kinds or vegetables and fruits of the best kind, is mixed and boiled, it will be of the best taste. The said Panem Kilenkoo is sold from 6 to 12 Kilenkoos for a farthing here—when the Palmirah trees are succeeded to the age of 30 or 40—each Male tree can be sold from 3*d* to 9*d* and female tree from 1*s* to 4*s*; and so on, according to the quality, the rate of trees are generally increased or diminished.

Female Palmirah trees are of more income than the Male ones—Palmirah trees after hewn down made use of for the construction of houses and for well whips, and Palmirah olahs are made use of for thatching the roofs of houses and for fences, also made use of as food for cattle and buried into the Paddy field for enriching the soil; the said Palmirah olahs are also made use of for different purposes, such as for manufacturing Mats, Baskets, Bags and water baskets of different kinds &c. &c. A greater number of Jaffna people, those who are reduced to poverty in particular, pass their days upon the produce of the Palmirah trees, (¾ of a year). No cultivation, difficulty, care, watching, watering or manuring is at all necessary to make the said Palmirah trees to thrive, but the fences only should be kept up in good order—It is my opinion that Palmirah trees are of more income than other Plantations of Jaffna.

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MR. ROBERTS' ACCOUNT.

DESCRIPTION OF THE PALMIRAH TREE OF CEYLON.

(BY THE REVD. JOSEPH ROBERTS, *Author of "Oriental Illustrations of the Bible."*)

To the Editor of the Wesleyan-Methodist Magazine.

If you think that the following description of the Palmira Tree, (pronounced by the natives *Pannai Maram,)* drawn from my own observation, will be interesting to any class of your numerous readers, it is with much pleasure at your service.

JOS. ROBERTS.

Batticalo, Ceylon, December 1: 1821.

The Palmirah, or "Borassus Flabelliformis," Lin., grows most luxuriantly in the province of Jaffnapatam; and shows in a most striking light the wonderful care of Providence for the inhabitants of these climes. It is raised from seed only; and is seldom less than eight or nine years before it bears fruit. It grows to the height of one hundred feet, and upwards, without a single branch on its trunk, except when young. The numerous uses of this tree are truly astonishing. To proceed with order, I shall begin with its leaf, which may be taken off at the age of two or three years. Of this the natives make all their books, which are in manuscript, executed with an iron instrument called *Elluttane*. The *Eadu* (book) is generally from fifteen to eighteen inches in length; and will endure as long, or longer than the best parchment. Nearly all their deeds, wills, &c., are made of this leaf; which has led Government to keep a quantity stamped in every cutchery, to prove all agreements made thereon legal. That the same article of which is made a book should furnish thatch for a house, may appear strange; but it is the fact. The most violent rains will seldom penetrate through it; and it will endure two years. All their strong mats, which are used for many purposes, owe their origin to this leaf; as also do their sacks, or bags, in which they carry grain to the bazaar. For buckets, or baskets, the Malabar is not indebted to the osier, or the oak. He has only to ascend his favourite tree; and he is furnished with an article to contain his vegetables or fruit, and another to draw his water; from the fibres of the stalk he manufactures a strong rope, which serves for almost every domestic purpose. To free his garden or yard from impurities, he needs not the birchen broom; he only takes a part of the leaf called *Eekel*, and his wants are supplied. As for a fan to refresh him, or to defend him from the bite of the fierce musquito, he finds it at once in this most useful leaf. Poor European descendants are not, like their progenitors, indebted for their hats to the beaver or the hare. This leaf forms a cover for both sexes from the weather or the sun. And to make the hat or bonnet something like (as he considers) those in Europe, about which he talks so much, and knows so little, the plaits are varied in colour. The Malabar's pouch in which he puts his tobacco, chunam, beetle-nut, and knife, without which he would feel as much at a loss as a school-boy without a pocket, is taken from this leaf. Of this he makes his garden-fence; and by it he is supplied with an umbrella to defend him from the sun.—The male tree bears no fruit; but the flowers when given to cows make them produce a great quantity of milk. They are also used for medicinal purposes, and are said to be of an anti-febrile nature.—From this tree is extracted a liquor called *Kallu* or *Toddy*, said to be very wholesome, which is carried to the market in a vessel made of the leaf. Thus the poor Cooly is supplied with a cheap and wholesome beverage, simply drawn from nature's springs. However, it must be confessed, that he has too often recourse to his much-loved chunam, which soon produces fermen-

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tation in the liquor, and deep intoxication in the drinker. The jaggery, or sugar, made of this, is certainly coarse; but it satisfies their palate and their wants. Lime, used for plastering, or in good walls, is generally mixed with jaggery, which makes the work susceptible of a very high polish, and renders it exceedingly durable. From this, too, our tables are supplied with vinegar; and the baker with yeast. If distilled, it would yield good arrack.—The fruit, when half ripe, is called *Noonku*, and contains a fresh gelatinous pulp, which is much esteemed. When ripe, it yields an article of food for the wet monsoon. This preserve is called *Pinnato;* and is prepared by simply spreading the pulp on a mat, and exposing it a few days to the sun. When it is mixed with rice-flour, it is said to make an excellent cake.—But I must not forget to mention another important advantage derived from this invaluable tree. The preserve, or *Pinnatu*, if always taken alone, would prove too luscious for the stomach; but ample provision is made to counteract this evil. When the seed has been in the ground about three months it yields a fine bulbous root, of a conical form, about fifteen inches in length, which, when boiled, is exceedingly simple and nutritious. From this is also made gruel, which is administered to the sick.—When the tree is cut down, the tender shoot makes a good pickle.—To conclude: the timber of this tree is considered, for rafters, laths, and spouts, the best in India. Great quantities are exported to the Continent. To give an idea of its extent, it needs only to be stated, that in 1811 the amount of export-duty on this article alone amounted to twenty-three thousand five hundred rixdollars.

Having given this unadorned and minute description, the reader is left to make such reflections as the cast of his genius may suggest. One thing I may safely say, that *piety* will here find a subject for astonishment and praise.

FROM CORDINER'S CEYLON.

The next most useful of the palms in Ceylon, is that commonly known by the name of the palmyra tree: *borassus. flabelliformis, frondibus palmatis plicatis cucullatis, stipitibus serratis.*" Its manner of growth is similar to that of the cocoa-nut. Its bare stem attains nearly the same height, but is of a stronger and harder timber, and grows more uniformly perpendicular. The leaf is shorter, and of a different shape, having the form of a spread-out fan, divided into slips, with a long foot stalk. It is of a substance as hard as parchment, but of a thicker texture; and is used over all India for writing upon with the *stylus*, and for making the books of the natives. The leaves are likewise used in constructing and thatching houses, but do not answer so well as those of the cocoa-nut. They are, however, formed into very excellent fans and umbrellas. The fruit is of the size of a twelve-pound cannon shot, almost round, of a soft pulpy consistence, delicious fragrance, and black colour, containing within it from one to three nuts, of the shape of a common hazel nut, and of the size of a walnut. The wood of this tree is hard and durable, and is never injured by white ants. It is much used in the building of boats, and in forming rafters, doors, and windows, or Venetian blinds, in the construction of houses.

Palmyra trees are to be seen in all parts of the island, but are most common in the northern provinces. In the district of Jaffnapatam they abound so much that their sweet fruit, called in the Malabar language *panningai*, forms a principal article of the food of the poorer classes of the inhabitants. The pulp is separated from the nuts, or seeds, baked into cakes, and dried in the sun. These

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become hard and red, and are eaten with coarse sugar, in the same manner that the Cingalese eat the kernel of the cocoa-nut, and not unfrequently used as a relish to rice, when no other seasoning can be procured.

The nuts are collected together, and buried in heaps below ground. When dug up after the space of three months, the young shoots, called *kallangu*, supply the inhabitants with another nourishing aliment, In size, colour, and shape, they resemble a parsnip, and taste like a cold potato. The *kallangu* has a loose outer skin or covering and under it a stringy adhesive coat, similar to that which surrounds the core of the sugar cane. The tapering point grows upwards, and contains within it a hard shoot, of the thickness of a straw, ready to burst into leaves. In its fresh state it continues good for two months, and when well dried in sun-shine it keeps in preservation for a whole year. The natives of Ceylon relish it much as an article of food, and eat it boiled. Large quantities of it, both fresh and dried, are sent from Jaffnapatam to Colombo, where it meets with a ready and constant sale.

The *toddy* drawn from the palmyra tree makes better arrack than that from the cocoa: and both it and the pulp of the fruit produce sugar, which is exported to various parts of the island, and the neighbouring peninsula. This sugar, formed by a simple process, is less refined, and of a darker colour than any which is imported into Britain. When put on board of ship, or exposed in the market for sale, it is merely packed in the leaves of the palm, from the juices of which it derives its origin.

(From Bertolacci's Ceylon.)

No. VIII.—PALMYRA REAPERS AND RAFTERS,

Are timber made from the palmyra-trees, which cover, with their extensive plantations, the Peninsula of Jaffnapatam, and flourish in all the northern provinces of Ceylon. After the cocoa-nut tree, the palmyra is the richest plant in the east. Cordiner has given an accurate description of it, to which I refer the reader. I must, however, add here, that the toddy drawn from this tree, for immediate drinking, or out of which arrack may be distilled, is different from that which is boiled and made into that kind of sugar denominated *jagery*, and which has already been described in speaking of the cocoa-nut tree. The juice from which arack may be distilled is properly called *toddy*, and the other is named *paddeny*; and the difference is the same as between the toddy and *mirra* of the cocoa-nut tree. The arack from the palmyra is not superior to that of the cocoa-nut tree, as stated in Cordiner, but inferior, and hardly any of it is distilled. It is not at present an article of commerce, though it may probably become so hereafter. A palmyra-tree requires ten years before it bears fruit, but, as is asserted, will continue doing so for three hundred years. The value of the tree, when cut down, is from four to five rix-dollars; and the revenue derived from it, annually, may be reckoned, on an average, at something more than one rix-dollar. There is at present a duty of twenty-five per cent. *advalorem*, agreeable to the tariff, charged upon the exportation of palmyra timber, which yields to Government an annual revenue of about 25,000 rix-dollars. This tree contributes, in so many ways, to feed the lower class of natives in Ceylon, and is so slow in its growth, that it would be a very unwise measure to encourage too much the cutting of it for exportation, by a reduction of the said duties; although it was at one time, unawares, recom-

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mended. Both the public revenue and the country would very likely incur a serious loss by any hasty measure of that sort. The fruit of this tree, when green, affords a pleasant beverage; and, when ripe, a nourishing and wholesome food. At times, the juice of it is pressed; it then hardens, and is preserved for a long time, and eaten by the natives in different ways. The shell and the fibres, after the juice is pressed out, form excellent fattening food for cattle; and if the fruit be put under ground for two or three months, it strikes strong roots, which are also good for the food of man. Indeed, many of the natives, and perhaps not without some reason, think the palmyra a richer tree than the cocoa-nut; and, by requiring much less moisture than the latter, it is better adapted to the climate of the northern districts of Ceylon, where, at times, no rain falls for six or eight months.

Under the Dutch Government, the exportation of palmyra reapers and rafters, from Jaffnapatam, was, for a long time, entirely prohibited; except when the Commander and the Disave, or Collector of that district, granted a special permission, for which they exacted a certain douceur. The Government at Colombo, being informed that the advantages derived by the Civil servants at Jaffnapatam, from this arrangement, were too considerable to be left in their hands, resolved to permit the exportation of palmyras, subject to the payment of a duty to the Company; and, by an order of the 3d of January 1717, granted to the Civil servants at Jaffnapatam the sum of five hundred rix-dollars annually, from the produce of this tax, as a compensation for the emoluments of which the regulation imposing it had deprived them. When the Dutch territories in Ceylon came under our possession, the revenue derived to Government from this branch of trade was not one half of its present amount.

THE PALMYRA TREE.

(*By the* REVD. M. WINSLOW, *American Missionary.*)

The *Palmyra* is of more importance to the inhabitants of Jaffna, than the cocoa-nut tree, yielding much more for subsistence and comfort. It is the bread-tree of this district. Unlike the cocoanut, it grows well in the dry soils, and needs little care in the cultivation. It is a tall erect tree, its shaft, from the root to the tuft of leaves at the top, being sometimes 100 feet in length, and nearly as smooth as a ship's mast. Its leaves branch out and stand round the top, as so many spread fans, of very large size, with their handle clasped on to the trunk, and fastened by a thick loose bark or covering, which falls off with it when the leaf decays. In the midst of these leaves, and clustered on stems like grapes, is the fruit, about the size and shape of a foot-ball. It consists of a thick, stringy and nutritive pulp, is eaten, usually after partial roasting or heating, by sucking it out from among the fibrous particles, or squeezing it with the hands. In this state it is also spread and dried in the sun, in thin layers, for after use. The taste of the fruit is sweetish, and is much admired by the natives, though few foreigners can relish it. The enclosed stones are buried in the ground a short time, when they sprout, and send out an esculent root or stalk, (for it is the germ of the young shoot,) which in size and shape is like a carrot. This is roasted and eaten, in its natural state, or it is dried and pounded to flour for food, to be used in various ways. The shell of the nut makes very good coal.

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MR. WINSLOW'S ACCOUNT.

VARIOUS USES OF THE PALMYRA.

From the palmyra, as also from the cocoanut, is taken a sweet sap, which, if boiled down immediately, makes a coarse kind of sugar used for sweetening, and also is mixed with lime mortar to make the better cement; or if the juice is fermented, it makes an intoxicating liquor. The sap exudes from the stems which set for fruit. They are cut off at the end, so as to prevent the fruit from forming; and the cutting is daily renewed to bring out all the juice, which rises freely while the fruit is growing. It is the business of one of the lower castes, called "toddy drawers," to climb these trees and collect the toddy, which is received in small pots hung upon the stems. This they do with great agility, connecting their ancles with a cord about a foot long, and sometimes their wrists, (after clasping round the tree at the bottom,) with a kind of ring,—the latter strengthening their hands to hold on while resting, and the former helping them to ascend by catching on the tree, when pressed by a foot at each end. Many, however, of these poor creatures, either because partially intoxicated, to which they are much addicted, or because careless, or weary, or sometimes by the breaking off of a stem at the top on which they have rested, fall from a great height upon the ground, and are almost literally dashed in pieces.

But to finish concerning the uses of the tree: a considerable part of the trunk, or shaft of the female tree,—the other which bears no fruit being also very inferior as timber—makes strong rafters, and good though small beams. It is easily split, and very durable. The out part or shell only of the tree is used, however, as the heart is a loose spongy substance, without any strength; but this in some respects makes the tree more useful; for by removing the heart you have a hollow tube or trough of the outer part; and by merely splitting that, you have lath and other small timber to your liking. The timber has a black and very coarse grain, so as to be a little like bundles of small iron wire, cemented together. When it rots, this cement first dissolves, and leaves the wiry fibres to fall apart, which makes their resemblance to so many wires still more perfect. In some cases, however, where the grain is fairer, it is capable of receiving a high polish.

The leaf of the tree is very useful. It answers as a kind of umbrella, when held by the stem over one's head;—or, cut and shaded a little; it makes a very decent fan; or what is much more important, it forms an excellent thatch for houses, a good addition to a hedge, and valuable forage for manure. Split into long strips, of an inch or two in width, it forms what is called an *ola*, on which the Tamul people write with an iron stile, pointed with steel. These, connected by a string passed through a hole or two in each leaf, form a *native book*. Still more narrow strips of the leaf are braided into baskets, mats and bags; the former of which are used for drawing water, as well as other purposes, and the latter not only for conveying rice, salt, &c. in small quantities, but for storing grain, being made very large and strong; while the mats are necessary for the natives, not only to sit, eat, and sleep on, but for drying various kinds of fruit, treading out their grain, and many other purposes. On the stem of the leaf is a very hard and strong covering, like that on bamboo or rattan, which, slit off, is formed into coarse strong ropes, while the stem itself, about two feet long, answers well to make hurdles for sheep, or to burn. With the part of the rough scaly bark, which attaches it to the tree, and falls off with it, it is one of the principal sources of fuel to the poor. A native therefore, if he will content himself with rather ordinary doors, (windows he wants none,) and the common mud wall, may *build an entire house*—wanting no nails or iron work—with posts, plates, roof, and covering, of the *palmyra tree*,—from this same tree he may store his grain—make his

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bed—furnish his provisions—kindle his fire—draw or bring his water ; and (by the help only of an earthern pot set on three stones,) cook his food—sweeten it if he chooses—procure his wine, (such as it is,) and live day after day dependent only on this tree. Indeed multitudes do live much in this way, and it may be fairly stated, that the palmyra furnishes scarcely less than a *quarter of the whole means of subsistence*, of the natives here. At the same time, as there is little expense in the cultivation, and it affords much aliment, though of a coarse kind, the effects of it upon the Tamul people are something like those of *potatoes* upon the Irish ; contenting them too much with the mere maintenance of life at the lowest ebb ; so that, if from any cause, these means of subsistence are considerably lessened, famine is the inevitable consequence. As a corrective of this, however, in a place where the population is so dense, that a famine, or even a scarcity makes awful ravages, a wise Providence has provided that the people should not depend wholly on any one kind of fruit or grain ; and the *rice*, which is the other principal dependence, is not exposed to fail by causes which might affect the fruit of the palmyra.

FROM J. W. BENNETT'S CEYLON AND ITS CAPABILITIES.

The third palm, in point of value for its domestic properties, is the fan palm, or palmyra (*Bor : fla. L.*)

Like all the other palms, the fronds of the palmyra grow on the top of the tree only ; but as these are cut down, or fall off, they leave their *vestigia* much more distinct than either of the other palms, and the bark is consequently so much rougher, that the tree may be ascended with less difficulty, by inexpert climbers, than either the coco-nut, areka, or sugar palms.

The spathe resembles that of the *Areca Catechu* in toughness and elasticity, and is used by the natives for similar purposes.

This tree is more common in the Northern and Eastern Provinces, than in any other part of the island ; and those that I have seen, seldom exceeded thirty or forty feet in height.—The fronds are fan-leaved, armed with spines radiating from a common centre, and the *stipes* sawed at their edges. The fan-part is about four feet in diameter ; the spines are cut off, and the middle is formed into fans, or *Punkahs* ; these are lackered for sale, or used plain, as may suit the taste of the purchaser ; but one never sees a Budhist priest without one of the smaller sort, or a fan of some kind or other ; of which, some are heart-shaped, others circular, with handles of carved Ivory.

I have heard many arguments as to the fan being an emblem of authority ; and some pretend that the degrees of the Budhist priesthood may be distinguished by their fans ; but I do not state this as an ascertained fact, although I have myself observed, that the handsomest *Punkahs* are carried by the higher order of the priesthood.

Palmyra leaves are subdivided longitudinally into strips for native books and letters, and bear the general name of *Olas*. These are written upon with an iron style, and lampblack is then rubbed over the writing, which makes the characters more legible ; this, from the smoothness of the surface, is easily wiped off, leaving the part that is not impressed by the style perfectly clean.

The fruit, which is a three-seeded drupe, grows in branches, and is much esteemed. Palm-oil is made of the pulp, after having been exposed to the sun and become rancid. The spring leaf, or Killingo, is a most excellent vegetable, when

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boiled or fricasseed; this the natives manufacture into a nutritions meal, or flour, of delicious flavor, by cutting it off close, after the seed nuts have been sown a few months, then drying it in the sun, and afterwards pounding it in a rice mortar. The Dutch formerly considered palmyra flour so very valuable as a convalescent diet, as well as for presents to their friends, that they often exported it to the Cape of Good Hope and Holland:—in both places it was much esteemed, and used for thickening, and imparting its peculiar, flavour to soups and made dishes.

Palmyra toddy is drawn from the flower, and good *Jaggry* is made from it, by a similar process to that described in the preceding pages.

On the outside and at the base of the fronds, just where they rise from the stem, there is a soft cotton like substance, of a light brown color, which is collected and employed by the native Doctors for staunching blood, or hemorrage.

The timber, being dark and beautifully striated, is very much esteemed for cabinet work; and by builders, for rafters, &c. It is extremely durable, becoming harder and tougher with age.

FROM SOUTH INDIAN SKETCHES, BY S. TUCKER.

I will return again to the Northern Districts of Tinnevelly, to tell you of the missionary work going on there, but must now transport you across the country, and place you among the palmyra-trees in the South Eastern districts. The face of the country is here completely changed; the tamarinds and other spreading trees have disappeared, and the almost level plain of arid sand, extending for many miles along the coast, and stretching far inland, seems to baffle the industry of man, and scarcely yields a shrub or vegetable to repay his incessant toil.

But the providence of God has not forgotten him; and here, *where nothing else will grow*, the palmyra is provided without human care or culture; the sandy plains are covered with it, and though it can boast of no beauty in its outward form, it affords him a supply of almost all he wants.

From the wood of this tree the villagers procure the stakes and rafters for their huts; the leaves * they use for thatch, and for fences for their little gardens, or they split them into oleis for their writing, or, cutting them into still narrower strips, make them into mats, or weave them into those pretty baskets you so often have admired.

Of the fibres of the stalk they make their ropes and coarse mats, and the blossom and fruit furnish them with nearly all their food.

The villages in these palmyra groves are inhabited chiefly by "Shânars, an industrious hard working race, reckoned among the lower subdivisions of the Soodras.

From all that I can find about them, I am much inclined to agree with those who consider them to have been the original possessers of the country, and that when the conquering army of Râm took possession of the richer northern districts, the Shanârs were suffered to retain their palmyras unmolested.

* * * * * * * *

The cultivation of the palmyra-tree is also the exclusive right of one division of these people, called the "climbing Shânars," and is never infringed on by any others.—It is indeed too difficult a task to be accomplished by any who have not

* This singularly formed leaf grows in natural folds, like a large fan, only that the folds meet in the centre, and at the outer edge separate into long taper points.

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been accustomed to it from early youth; and some of our English boys who pride themselves on the ease with which they can climb an oak or an elm, would be puzzled to know how to reach the top of a palmyra.

The annexed engraving shows you the character of the tree; it throws out no branches, and its tall stiff stem rising to the height of forty, sixty, or even eighty feet, affords but slight assistance to the daring enterprise.—

The Shânar, has a way of his own contrivance—he puts his feet into a long loop woven from the fibres of the leaves, whose roughness catching the slight unevenness of the trunk, may assist him in his ascent, or preserve him from a fall, and with 5 or 6 earthen jars slung at his side, a knife stuck into his girdle, and without any covering but the cloth worn round the waist, and occasionally a breast-plate of leather, he clasps his arms round the tree and with astonishing dexterity quickly gains the summit. Here, at the beginning of the palmyra season, he finds among the cluster of fan shaped leaves that crown the stem, several large long sheaths that contain the flower buds. Over each of these he hangs a jar, and cutting off the top of the bud, the juice begins to flow on till evening. Another and another tree is thus visited, and a skilful climber will sometimes visit as *many as* 40 *trees* in the course of a few hours. They are generally thus employed from 3 or 4 o'clock in the morning till noon, when they return home to rest during the hottest part of the day, and go to work again from 3 or 4 o'clock in the afternoon till 9 or 10 at night. For 4 or 5 months the bud continues to give out its precious juice, and every morning and evening the industrious climber goes thro' the fatiguing task of visiting each tree, emptying the jars into a closely woven basket of palmyra leaf which he carries with him, and then makes over his hard-earned treasure to the management of his wife.

You will readily suppose that this is a dangerous, as well as difficult, employment. A single false step among the leaves, or one moment's letting go his hold in ascending or decending, precipitates the poor Shánar to the ground, and the half yearly reports of the missionaries, frequently contain the account of one or more of their people who have been found dead or dying at the foot of their trees.—

The work of the wife is less dangerous, but not much less fatiguing then that of her husband. As soon in the morning as she has arranged her few household affairs she joins him among the trees and begins her work by enclosing a small space which a fence of palmyra leaves.—She then lights a fire with a kind of low thorn that grows here and there among the palmyras, and proceeds to boil down the sweet juice she received from her husband, called in this state "*Puttaneer**" into a thick syrup, which she pours into Cocoanut shells or holes scooped in the sand, where it hardens into a coarse black kind of sugar called "*Kuripekutti.*"† If the poor woman can find a margosa (*Melia Azadirachta,*) or other spreading tree, she gladly avails himself of its shade, but these are rarely to be met with, and she generally has to stand over the fire exposed to the burning rays of the sun, from the morning till 6 or 7 in the evening.—Her work is not yet ended, she must boil the rice for her husband's supper, and when he returns must bathe and shampoo his limbs to remove the stiffness, and prepare him for his next days' work.—

The intoxicating liquor called "toddy," or more correctly "tari," is the fermented juice procured both from the cocoanut and palmyra tree; but the shânars of Tinnevelly very rarely make this use of it, and in order to prevent the fermen-

* "*Putta,*" palm; "*neer,*" water.
† Black lump.

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tation which otherwise would begin as soon as it was exposed to the air, they line their jars with a coating of lime.—The Palmira nut, in its different states, supplies the principal part of the food of the Shânars during almost the whole year.—While the season lasts, the puttaneer that is found in the jars in the early part of the day, is, as I have told you, boiled into kuripekutti, and a good piece of this, accompanied perhaps with a little salt fish or oil cake, forms the noonday meal. The supper consists of a little coarse rice and a draught of puttaneer, while this juice alone suffices for their simple breakfast.

When the Puttaneer season is over the faithful palmyra yields them subsistence in another form. A certain number of the trees have been left untouched until the fruit is ripe, and this they now gather for present use or future produce. Every tree produces 30 or 40 nuts, each containing 3 smaller ones, embedded in a fibrous pulp, and filled with a cooling and refreshing substance like jelly. It is sometimes eaten in this state, but they more frequently roast the whole fruit, and peeling off the outer rind eat the remainder. But there is still another state in which this invaluable nut serves for food. It is kept till the outer shell is hard, the inner nuts are then taken out, and planted in the patches of sandy ground that surround the village. In this favorite soil the nut throws out a taper root the size and shape of a small carrot, but in color and taste like an indifferent potatoe, and as soon as the green shoot appears above the ground, it is dug up and affords support during another portion of the year.— * * * * * *

"Sometimes when they have more kuripekutti than they require for their own consumption, they boil it again into a yellow sugar Candy. This is in common use among the Natives through all Southern India ; and if on a journey your stock of real sugar candy should be exhausted, you will be glad to meet with so good a substitute. On the spot it is sold in square baskets, which are finished after the Sugar Candy is put in, so that you must cut them open to get at the contents ; but in the Bazaars small quantities are exposed for sale, in a little boat made of two leaves prettily fastened together with thorns.

GHAUTS OF TINNIVELLY : PALMIRAS, AND ABORIGINES.

(*From Dr. Duff's Speech at Agra,* 1849.)

"This range of ghauts is, on the western side, exposed to the southwest monsoon in all its fury in the middle of June. It beats up the whole Western range, bringing with it the clouds which appear overlapping the eastern summits. There they then rest, (excepting some small rills) nothing of moisture is given to the eastern side. The winds rush up the western slopes, and sweep off the clouds over the land and coast to the Bay of Bengal. On this side the heights are steep, while the ghauts] to the west gradually descend. At first they are rather precipitous, then gradually descend, and run out into knolls and undulations. The promontory is all richly wooded, and up to the tops of the ghauts, the western slopes are covered with evergreen forest. Interpersed and below, on the eastern side, are little cultivated plains, producing paddy, cocoanut and bread-fruits, but the rest is bare—the western coast being as fertile and rich in verdure as the eastern shore is bleak and barren. Yet on this bleak and barren eastern shore, the number of human beings amount to ten thousand, who live on the palmyra trees. During four months of the year they draw the juice, and for other six months they go about selling the produce. There is not a more sober race under the sun, and they are

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altogether a simple people. The Brahminical power did not extend to them; for the Brahmins fed on the richest pasture, just as was the practice of the monks; hence it was that in Scotland if any one wished to trace out where the monasteries had been he had only to ask which were the fattest places, and there he would find them. Tinnevelly had been very much exempted from the Brahminical scourge, yet it would not do to let its inhabitants altogether alone. They found the people fed on the saccharine juice called *Jaggree,* and that with the surplus of their stock they purchased grain, so that there was little over to give to them. The people seem to be the aborigines of the Continent, and of the abominable worship of idols they had none; but they believed in wicked spirits, and had a system of Devil worship, and a 'Demon temple.' There the Brahmins came and said to them,—'you have evil spirits whom you serve; we have good spirits; you have only the spirits, we have the mother of these, whose name is Kalee,' and they gave them Kalee as the mother of their devils to be their God. Their system embraced any spirit for whom they had respect, but the spirits of men may become demons, as in the case of murdered men; and to propitiate these it is that they render them homage. They offer their sacrifice at a Devil dance, and when you have the glare of their torches by night, and the excited throng, with the Palmyra forests around, all is wild and lurid, and the music is as wild as themselves. To the front of the Devil temple they bring their goat and impale it; then comes the devil dancer, and cuts a gash into the flesh of the victim, and from the gushing veins drinks out the living blood! He drinks till the stream is exhausted. Another and another victim are brought, till the blood of two or three sheep or goats has been exhausted. Then he sets out to dancing, and turns round and round, and round and round, till he falls reeling to the ground insensible. In this state he lies for a while; then he begins to revive, utters sounds, the indication that he is now inspired by the demon; and the people gather around and listen to his voice. This is turned to purpose. Thus a mother whose child may be suffering from the small-pox will come from a distance to enquire how she may cure her child, and the reply will tell her to go and make offerings at another shrine. It is an astonishing fact. that while multitudes that pretend to knowledge, and learned Pundits and Brahmins, reject the offers of a free salvation, numbers of these poor infatuated people have been led to enquire into Christianity, and to renounce their demon worship. Thus it is that at this present moment this has become the most promising mission field in India."

THE PALMYRAH AND FICUS INDICUS: VEGETABLE PHENOMENON.

From the Youth's Instructor for 1836. Vol: 20th Page 37.

The accompanying engraving is a sketch of two trees, growing in front of a rest-house, called Comatty-Savady, about four miles South West from Cuddalore, in the East Indies. The Palmyrah and Ficus Indicus trees have been frequently described to the English reader; but I am not aware that the common phenomenon exhibited in this sketch has been so much as noticed. I say *common,* for I think I speak within bounds when I say, that I have seen near two hundred instances. I account for its frequent recurrence in the following manner.—The Palmyrah advances very slowly in height, during the first years of its growth; nevertheless, it annually opens its pair of new leaves. Near the habitation of men, and

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especially when there is a scarcity of fuel, these leaves are cut off as they dry, leaving nothing on the stem but the tuft of green leaves at the top, but in other cases the lighter part of the leaf only falls off, and the stems stand out from the body of the tree, "like the quills upon the back of the frighted porcupine." The stems form a convenient feeding place and roost for various kinds of birds; and from their pointing upwards, they are a proper receptacle for the seeds dropped by the birds in eating.

The Indian fig appears formed by nature for taking advantage of this circumstance; for no sooner does its seed germinate, than it wraps itself around the first object it meets with; and, as if by instinct, clasps its foster parent till its roots reach the ground;—and then, in a very short period, this giant-creeper completely enwraps the Palmyrah within itself; and a union is formed, which must continue till one or both the trees shall die and decay.

I have seen many much finer specimens then the orignal of that which I now send; but this banian having recently had its branches lopped off; thus exposing both trees in their full length, and the circumstance of their standing in front of the rest-house, where I was spending a day, induced me to sketch this rather than another. I hope it will prove an acceptable present to the juvenile reader.

(Signed) J. CRYER.

Manargoody February, 25th 1835.

PALMYRA SUGAR.

(*From the Madras Atlas, of February* 26, 1846.)

Every climate, and every soil has some product or other indigenous to it that makes up for the absence of other advantages. We have travelled a little in the interior and have not failed to observe in many parts extensive tracts of land wholly uncultivated. They cannot be brought under the plough because their irrigation would be made to depend on the uncertain rains of heaven. Yet these unproductive soils, may be made to yield a revenue to the capitalist.

There is a sugar manufactory at Cuddalore, from a member connected with which, we learn that the inspissated juice of the palmyra, manufactured into sugar by the European process, realises a higher price in the London market than that obtained from the cane, for this reason, that it is more granulated.

If this be true—and on this point we should like to obtain intelligence from those who are engaged in manufacturing sugar, with a view to public information, those poor soils whereon only thorns and thistles now flourish, might be planted with palmyra trees, and thus rendered productive. The palmyra will thrive any where; it is to be found on the most arid soil; and it is therefore an interesting enquiry how far this cultivation may be extended with profit to the capitalist and with advantage to the State.

But the times in which we live will not allow speculators to lay out their money and to wait many years before they could calculate on a return. The moment we sow we desire to reap; men are anxious to grow rich in a day, and in the pursuit of a phantom lose the very thing for which they so eagerly panted. Now, the vegetable kingdom, if properly attended to, will be found a mine of wealth to a nation. The mineral world is doubtless invaluable *per se*, but when compared with the vegetable, it is surpassed in intrinsic worth. Our gold and

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silver are precious as circulating media, but as the Prince in the eastern tale, who, having been overtaken with thirst in the midst of a desert, offered half his wealth for a glass of water, we should find, if placed under similar circumstances, that money cannot satisfy the calls of hunger nor quench the sensations of thirst.

Without in the most remote degree desiring or intending to insinuate aught unfavourable against our Agri-Horticultural Society, we think that a Company might be formed expressly for the development of the vegetable resources of this splendid country. Within the limits of British India almost every want of civilization might be supplied.

PALM SUGAR.

The approaching appearance in the market of the world of a new variety of Sugar, much superior for its richness and cheapness to all known sorts, is announced. It is the immemorial sugar of India, such as was used in the most remote antiquity but prepared by the improved processes of modern science. This sugar is extracted by incision, from trunks of palm-trees, cocoanut trees, and sago trees; sometimes from an opening made under the flower buds, sometimes from a wound cut in the tree under the origin of the leaves. A single palm tree will, thus yield, during a little more than 3 months, about 2 quarts of liquid a day; this liquid, when thickened, is called jogre, and it resembles the raw sugar in its color, its consistency, and its smell. The ancients confined themselves to the thickening it in boilers, without submitting it to any refining operations; but things have changed since the processes contrived in Europe for the preparation of beet sugar have been applied to the palm tree jagre. Samples truly admirable have been sent from Paris: they are comparable to the best specimens of West India Sugar—A Colonist at Pondicherry has manufactured, during the last year more than 600,000 lbs; and it appears to be agreed, that the immense forests of palm trees, cocoa-trees, and sago trees, which cover the Indian plains, would be sufficient for the consumption of the world.— *Sud*—(a Marseilles journal)

PALM SUGAR.

This sugar—a considerable quantity of which has been recently imported—belongs to the class of white or refined sugars. It is yellowish-white, and has the texture and flavour of refined cane sugar. Subjoined is a notice of its origin and manufacture, furnished by the surgeon of the importing vessel to Dr. Pereira, by whom specimens were laid before a late meeting of the London Pharmaceutical Society. Palm sugar is manufactured principally at Cuddalore, on the Coromandel coast, by some French merchants of Pondicherry. It is obtained by refining the jagary or crude sugar used by the poorer classes in India. Jagary is darker coloured than the coarsest Muscovado; is granular or moist; and is packed in mats or bags made of palm leaves. It is chiefly brought from the island of Ceylon by native vessels, and is made by thickening the juice of various kinds of palm—principally the palmyra palm, the cocoa palm, the lesser fan palm, and the wild date palm. The juice is collected during the night, by making incisions in the upper-part of the stems of the trees and afterwards boiling it down before fermentation takes place. The thick syrup thus obtained is mixed with sand and stone to the amount of ten or fifteen per cent, to make it more solid, portable,

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and heavier. This jagary is refined by dissolving it in water over a fire, at the same time mixing chunam (lime from sea shells) with it to check fermentation; after this it is strained through a filter of animal charcoal, again boiled and strained through cotton bags. For the purpose of clarifying, eggs and chunam are used. When the syrup is of a proper consistence, it is put into wooden or earthen coolers, and the molasses allowed to drain off. To whiten it as much as possible, rum or sometimes a fine syrup, is poured over the sugar whilst in the coolers; it is then exposed to the sun to dry, and lastly packed in bags for exportation. It is never mixed with cane sugar. The sugar thus produced, the writer thinks, will eventually supersede that obtained from the cane. It can be manufactured at a less cost, and the palm affording it grow in abundance in all parts of the tropics, in a dry sandy soil which could yield nothing else of value. They require very little cultivation, merely enough to keep the luxuriant vegetation from springing up into a jungle around them, and to remove the numerous parasitical plants from their stems. Of course the sugar will improve in quality when more experience has been gained in the way of manufacturing it. The quantity produced last year was upwards of six thousand tons.—*Chambers' Edinburgh Journal.*

AINSLIE'S MATERIA INDICA:

Vol: ii *page* 280 *Chap*: 244.

PANNANGKULLOO (TAM.) TARIE (DUK.)

Tati Kulloo (Tel.) Tala (Sans.) Palmyra Toddy.

BORASSUS FLABELLIFORMIS.

The wine, or rather the sweet and pleasant tasted liquor called Palmyra toddy, which is drawn from this tree, though far inferior to that got from the cocoa-nut tree, is of a very cooling and gently aperient quality; and is ordered to be drank by the Tamool physicians in such cases as require drinks of that nature.

The tree, which is called *Tal* both in Bengalie and in Hindoostanie, is one of the most useful in India, and will be further noticed in other parts of this work.

There is but one species, which is, of course, our article. The male plant is the *Ampana* of Rheede (Mal. i. p. 13. t. 10. mas.); the female plant he mentions under the name of carimpana, at page 11. and table 9. Rumphius speaks of it under the appellation of *lontarus domestica* (Amb. i. p. 45. t. 10.). It is the *mú-rúme* of the Cochin-Chinese, and the *talgaha* of the Cingalese.

The Borassus flabelliformis is very common in India, growing generally in sandy situations near the sea; it rises to a height of about 30 feet, or more, with a trunk about a foot and a half thick, covered with a very dark colored bark, and containing a soft pith in the middle. The fronds are palmate, plaited, and cowled; stipes serrate, near six feet in length, flat, and somewhat hollow and rough, with spines along the edges; the leaf part is large, and wide, and folded like a fan or umbrella, for which purpose it is sometimes used; the fruit varies in size from a small orange to that of a child's head. From the sap, or sweet liquor, a coarse sugar is made; the liquor, though it may be drank fresh drawn from the tree without danger, on being kept some hours after the sun is up, undergoes a fermentation, and intoxicates.—According to Sprengel in his "*His*: *rei Herb*:" (vol i

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??? ` *dowm* is the Arabic word given by Aricenna (206) for the borassus flabelliformis, supposing it, certainly erroneouly, to be that tree which yields *bdellium*; see that article, in vol: i. of this work. Crawfurd, in his Account of the Eastern Archipelago, informs us, that at Celebes, and other parts of those countries, the Toddy of the Borassus flab: is called *tár and tala,* names similar, or nearly so, to the Dukanie and Sanscrit ones of India; in Timor it is termed *suwalen,* also *koli.* Roxburgh in his Coromandel Plants vol: i. p. 50·, tells us, that the male plant is called in Tellengoo *pootatáli*; the female *penty.* After the Caryotta urens, it is one of the largest palms on the Coromandel coast.

ARTICLE BDELLIUM.—vol. 1. P. 31.

It is a lamentable fact, that the actual tree from which bdellium is procured has not hitherto been ascertained by botanists; Woodville, in his Medical Botany, takes no notice at all of the article; *Sonini* in his Travels in Egypt, informs us, that it is nothing more than common myrrh in an imperfect state (see works P. 558); Sprengel, in his "Historia Rei Herbariæ," tells us, that *dowm* is the Arabic name, according to *Forskahl,* of the *borassus flabelliformis,* and it is from that tree, according to the testimony of both Kæmpfer (Amoen: 668), and *Rumphius* (Amb, I. 50), that bdellium is procured. As the reader may naturally wish to satisfy himself respecting so singular an assertion, he may find it in the work above mentioned ("Historia Rei Herbariæ, vol. i. P. 272), on the other hand, it has been said that the tree which yields *bdellium* is no other than the *chamærops humilis* or *dwarf fan-palm* of Linnæus (See Hist. Rei Herb., same page and vol: as those just quoted). Virey, in his Hist. Nat. des Medicamens, (i. p. 291), informs us, that it is got from a species of amyris, the *nioutt-outt*] of Adanson, which according to Forskahl, resembles myrrh. (Mat Med. Arab: p. 49.)

ARTICLE SUGAR p. 409. vol i.

* * * Besides the Sugar procured from the common sugar-cane, this useful article is obtained in India from other sources; such as from the toddy of the cocoanut. This kind of sugar is called *tenne vellum* (Tam.); *naril ka goor* (Duk:); *tentaiabellum* (Tel:). The sugar got from the caryota urens is called in Tamool *koondel panei vellum.* Then again, that sugar prepared from the toddy of the palmyra tree (borassus flabelliformis) is termed in Tamool *pannay vellum*; in Dukkanie *tan ka goor* and in Tellingoo *tatie bellum.* All these sugars are common in the bazars of India; they are altogether unrefined, and known by the English under the general name of jaggeries, which is also applied to common coarse sugar.

[Again, at page 410 Dr. Ainslie writes]:—

"The jaggery of the sugar-cane is called in Tamool *nulla vellum,* from being the best; that of Palmayra toddy is termed *karapootie* (Tam:")

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TODDY. *Khulloo* (Tam.) *khulloo* (Tel.) *Sura Tari* or *Tadi* (Sans:) *Saindee* (Duk.)—Vol: i. p. 451. cap: 232.

Toddy is the general name given by the English to those sweet, delicious, and refreshing liquors, which are procured in India by wounding the *spatha* of certain palms, when it exudes, dropping into earthen pots which are attached to the superior part of the stem of the tree for receiving them. The best of all these is that obtained from the cocoa-nut tree.* * * * * * * Taken fresh from the tree, early in the morning before the sun is up, it is certainly a luscious and pleasant drink, cooling, refreshing, and nourishing; it is, besides, employed for making the best kind of Indian arrack, and yields a great deal of Sugar. * * * Europeans, especially delicate females, in India, who are apt to suffer much from constipation, find a cup-full of this toddy, drank every morning at five o'clock, one of the simplest and best remedies they can employ. The *Vytians* prescribe it in consumptive cases. When the heat of the day has commenced, however, it is not so safe, as it then undergoes a degree of fermentation, and is apt to intoxicate and occasionally bring on cholera and bowel complaints. The different toddies to be met with in India are:—1st The cocoa-nut toddy just mentioned.—2nd The *Palmyra toddy* or toddy of Bor: flab: it is also sweet and pleasant tasted, but inferior to that of the cocoa-nut. * * * * * *

Besides the purposes of drinking, making sugar and arrack, to which the toddies in India are applied, they are also used for making vinegar, by the bakers as leaven for bread, &c.—That of the Palmyra tree (already mentioned) is in high repute in the Eastern islands, and is there principally employed for making sugar, and it was upon the leaves of this palm that the Indians chiefly wrote, before the use of paper became common.

* * Flo: Egyp°: Arabica (126) See Hist: Rei Herb: (vol: 1. 271).—

EASTERN ARTS AND ANTIQUITIES ILLUSTRATIVE OF THE BIBLE.

Religious Tract Society.

P. 131. 1st Wood, 2nd Sticks, 3rd Bark and 4th *Leaves.* Pliny states, that the most ancient way of writing was upon the leaf of the palm tree lib. XIII. Cap 2. The process is assuredly of remote antiquity; and to the present time, leaves of different trees are employed in the making of books among the Indian nations. The leaf generally used by them is that of the Palmyra tree, but the leaf of the Tallipot is prefered by some, seeing that it is superior in breadth and thickness to the other. A fine pointed style, or kind of bodkin, is used in the tracing of the characters; and, when traced, a composition of oil and pulverised charcoal is rubbed over, to render them distinct and permanent. The manner in which the Burmahs make their books of Palmyra leaves has been thus described: "In their more common books, the Burmahs, with an iron style, engrave their writing on Palmyra leaves. A hole thro' both ends of each leaf serves to connect the whole into a volume, by means of strings, which also pass thro' the two wooden boards that serve for binding. In the finer binding of these kind of books, the boards are lacquered, the edges of the leaves cut smooth and gilded, and the Title is written on the upper board: the two cords are, by a knot or jewel, secured at a little distance from the boards, so as to prevent the book from falling to pieces,

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but sufficiently distant to admit of the upper leaves being turned back while the lower ones are read. The more elegant books are, in general, wrapped up in silk cloth, and bound round by a garter, in which the Burmahs have the art to weave the title of the Book."

HISTORY OF THE INDIAN ARCHIPIELAGO: CRAWFURD:

Vol: 1 *P*. 443.

The *Lontar* (Borassus flabellifer) the *Tar*, or *Tal* of Western India, grows abundantly in the Indian islands, and is principally cultivated for its palm wine, which is chiefly used for the manufacture of sugar. The wood of the tree is dark, hard, and tough, and may be put to many useful purposes. It was upon the leaves of this palm that the Indian islanders wrote before the use of paper became common from communication with strangers. The leaf is for this purpose cut into slips about three inches broad, and from 12 to 18 inches long. These, after being scratched upon with an iron stile, are filed together as a book, by passing a cord through them at both extremities. It is probable that the islanders were taught to write on the leaves of the palms by the Hindoos. The palm is known as we might expect to find, with a tree that is indigenous, and very widely spread by a variety of native names. In Java it is called *Suwabu*; in Timur, and some of the neighbouring islands, *Koli.*—Among the tribes that wrote, or now write, upon its leaf the Sanscrit name has made encroachment on the native one. The people of Celebes call the tree *Tala*, which is the true Hindoo name.—The Javanese apply the compound native and Sanscrit word *Ron-tal*, meaning leaf of the Tal, to the leaf of this palm, as it is used for writing upon. In common language, this last word, by a transposition of the initial and final letters, becomes *Lontar*, which corruption, it is singular enough, has been borrowed by the Malays, and applied, not to the leaf, but to the whole tree.

In describing the Coconaut palm, and Saguire, the Coyr and Gomuti, those valuable materials of cordage have already been noticed. The *Gabang* (*Corypha L.*) is another Palm from the midrib of the leaves or rather branches of which an useful cordage is obtained by pounding and beating the dried stalk. This Palm which has been sometimes called the wild *Lontar*, yields a pith which affords like the *Gomuti* or *Saguire*, a *farina* resembling the true *Sago*, but of inferior quality.

CRAWFURD'S EMBASSY TO AVA P. 450.

The Coco and Areca palms are not very frequent in the Southern provinces even in the neighbourhood of the Sea, where they might be naturally looked for and as we proceed Northward, they become more and more scarce until at the capital they are only to be seen as varieties. The upper provinces, however, abound in the palmyra, or *Borassus flabelliformis*, especially the arid country, extending for 200 miles below the capital, where immense groves of it are cultivated.—A cheap but impure sugar is obtained from the wine of this palm, which is a substitute for that of the cane, and universally consumed throughout the country, forming an article of considerable export from the upper to the lower provinces,

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MALCOM'S ACCOUNT.—RUMPHIUS.

TRAVELS IN SOUTH—EASTERN ASIA,

THE BURMAN EMPIRE &c. &c. &c.

BY THE REVD. HOWARD MALCOM VOL: 1. P, 179.

The Palmyra (*Borassus*) grows everywhere, but abounds chiefly in the upper provinces, especially near Ava.—There are several varieties.—It issues from the ground the full thickness it is ever to be—about three to four feet diameter, and gains a few inches in height every year, throwing out no branches, and bearing leaves only at the summit.—It reaches the height of about 40 feet; and sometimes; but rarely, fifty-five or sixty feet. The leaves are of great size, standing out from a stem like the fingers of an extended hand.—From this species of Palm the leaves for writing are prepared.—The tree comes to maturity in about 30 years, but often takes 40.—The Male trees afford juice or *toddy* three months in the year, the female, seven or eight, each giving daily from 1 to three gallons, which is gathered by cutting off a shoot which would bear fruit, and suspending a pot or a bamboo to the end—Most of this is made into molasses or jaggery. Some of it is drunk fresh from the tree, when it resembles new cider.—By standing a few hours it ferments rapidly, and in that state is considerably intoxicating.—It is, I believe, never distilled.—The fruit is black, oval, shiny, two inches in diameter, and used after cooking in a variety of ways.—The stone of the fruit is a third of its bulk, and is buried in the ground for the sake of the large sprout it produces, which is prized as an esculent. Every part of the tree is made useful.—The sap is boiled down as we do that of the maple, and yields the tolerable Sugar called *jaggerey* in commerce.—Large quantities of this are made.

Vol: 1st; Page 104,

After passing Paghan, the Palmyra is very common.—This is the species of palm which here yields the toddy, and is therefore called by foreigners *toddy-tree.*—To many of them, slight perpendicular ladders are fastened, by which the owner ascends every morning to obtain the sap from a cut made for the purpose —But the regular climbers need no such aid. They tie their feet together, about six inches apart, and thus can apply the soles of each foot to the tree.—Locking their fingers together, they clasp the trunk with their arms, and thus ascend with rapidity and ease.—The sap or toddy is generally drunk immediately, when it is sweet and wholesome, or made into Sugar, which resembles that obtained with us from the maple.—When suffered to stand 4 or 5 hours, it ferments, and becomes more intoxicating than wine; but is rarely used in this state by Burmans, and almost never to the point of intoxication.—From Paghan to Ava, this species of Palm is very abundant, and produces a large amount of Jaggery, which sells for one-third of a penny per pound.

(Translated expressly for this work.)

RUMPHIUS' HERBARIUM AMBOINENSE.

VOL. I. CHAPTER ix.

Lontarus Domestica, Palma vinifera, prima sive Jagarifera. Lontar.

The second order of the Palma Indica, of which we have spoken, *supra*, chap. I., is the Viniferous, amongst which the Palmyra is the most distinguished, and is justly to be esteemed equal in importance to the Cocoanut-tree, by reason of its many uses and general utility. And indeed it is, if I may so call it, the

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representative of the Cocoanut tree, since it most commonly grows in places where that tree is not to be found. In the province of Amboina, it is for the most part exotic, except that some have been occasionally seen in the neighbouring islands: but many of its kindred are found in Amboina; wherefore I cannot omit to notice it; although I can only record the observations I have made from the few specimens I have met, or what I have heard and learnt from others. I have placed this, then, as the first under the Viniferous palms, not so much because it produces nothing but wine, (for this as well as the other species, like the Cocoanut, produces fruit, which are called *nuts*;) but because Wine and Sugar are its principal produce. The species is divided into *Wild* and *Domestic*; and the Domestic again into *Male* and *Female:* which shall be the subject of the present chapter: and, first, we shall describe the female, which is the most common and most known.

The *Female Palmyra-tree* is shorter than the Cocoanut, and taller than the Areca-nut tree, but thicker than both. In this country it is never higher than 25 or 30 feet; but in other lands, I understand that it is not much lower than the Cocoanut tree. Its trunk below is of a conic shape, (namely, its breadth, a little above the root, is 2 feet, which grows gradually narrower, till the breadth is reduced to one foot:) it is also divided by rings, which however occur at greater distances from each other than in the Cocoanut-tree, and are not so perceptible: the bark is dark-green and mossy, except when it is smoothened to facilitate the daily ascent of the Toddy-drawer. The branches are at the top, disposed in a circle, but entangled one with another; for some are oblique, others erect, and others again grow at the side; so that they form with the leaves a circular top. Each branch is above four feet long, and is more flat than that of the Cocoanut-tree; is, (as it were) somewhat scooped out, on the upper part; and has two sharp and slender edges, which have teeth like a saw; it is not however so smooth and bright as the Cocoanut leaf, and it has here and there a leaf having down, so that the Palmyra stem is not so smooth or even as the Cocoanut-tree. Each branch or stalk has a leaf, large, round and radiate, about four feet long, and divided into 70 or 80 radii, (as they represent stars or the sun), and these expand in a circle, and resemble an umbrella. The radii are unequally divided, and are dissimilar one from the other; (for the middle ones are longer and less cut out;) and make almost a complete circle; but the whole leaf is hard and smooth like parchment, of a dark green colour; and the radii are obtuse in the anterior part, as if they had been broken. Each radius has a hard fibre in the middle, and two thinner fibres between the folds, which lie on either side: and all these end in a circle, which is seen at the base of the leaf—as all the fellows of a wheel terminate at the nave. The young and tender leaf is folded up, and resembles a long horn or a shaft, and always grows from the centre of the crown; it is of a dark green colour externally, but white internally: and this white colour remains, when it expands itself; and between its folds there are some filaments which gradually fall off. The leaf itself is composed of two slender cuticles, between which there is a little green substance, so that these cuticles can be separated, and employed instead of paper and for other purposes. Between the smaller vertical branches, there intervenes another stalk or stem, which has a pointed sheath, as in the Cocoanut-tree; but more triangular: which, when it expands, displays three broad leaves. In this there is first a small pouch, formed of a slender skin, in which the true germ of the flowers is contained fixed to a single simple stem which is divided into many smaller ones, differing very little from the flower of the cocoanut; for at the extremities of the stalks there are six or seven capitula or tubercles which are the true male flowers.

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The fruit progerminate and over-spread almost the whole stalk and the side branches, there remaining only towards the extremity a space of two inches. The middle stem is about an inch broad, so that this branch can bear 20 or 24 fruits, which that of the Cocoanut-tree does not; and sometimes in one tree there may be seen two or three, or at most 6 or 8, such branches at the same time; although one is always larger and more advanced in growth than another It is also worthy of notice, that the female tree also bears similar flowers, such as shall be described hereafter of the male; but once only during her existence, before she bears the true fruit.

The fruit is a nut like the Cocoanut, but smaller and more circular, of the size of an infant's head; it is of a round-triangular form, compressed at both ends, with a little hollow at the top; but the lower parts are joined to a little saucer or plate which is composed of six scales, and is greater and thicker than in the Cocoanut. This little ball rests in another cup which is composed of 5 scales, and remains fixed to the branch. The nut is striped (or grooved) longitudinally, and the colour in the younger fruits is striped with a brownish green, but in the adults with brownish black tinged with yellow, especially the front part. In the oldest and falling fruit, it is brown. Under the outermost skin there is a fungous substance, which in younger fruits is white, as in the young Cocoanut, but in the old ones yellow, and so juicy or sappy that it can be pressed out; containing many fibres, as in the mango fruit, which adhere to the nuts. In very old fruits this substance is dry and fibrous, but thinner than that in the Cocoanut, which is called cairo (*coir*). In each fruit there are 3 nuts, of the size of a half-grown mango, or a goose's egg, a little compressed, "*instar scroti Hircini.*" This fruit is divided by two projecting enclosures inside. The shell is as thick as that of the Cocoanut, and is not black, but greyish. The fibres annexed to the shell or husk adhere together so firmly that they cannot be separated, and therefore these can never be smoothened. In the younger nuts the shell is so soft, that the upper part can be perforated with the finger; and in this, at that time, is contained a white, soft and watery kernel, with a little sweet cold water, which may be at the same time supped up, like the *liplap* of the Cocoanut, which however tastes better. In the adult, the shell above spoken of, as well as the interior kernel, is hard and horny, semi-transparent and cærulescent like ice; but then unfit to be eaten.

The wood of the trunk, which is joined to the exterior bark and is three inches broad, is white in the younger tree, but in older ones is of a reddish colour, marked by thick blackish veins, and is hard and horny and therefore difficult to be broken transverely: longitudinally however it is easily split. In very old trees, it is blacker, and may be polished to some extent; when it even assumes an excellent colour, by the running of the black veins through the red. Such wood however I have never seen here, towards the East; but I understand they may be seen in the trees in Indostan, as well as in those which grow in Coromandel and in Ceylon. Within this, there is a white pith, which is fungous, and consists of short fibres. The root is broader and blacker than that of the Cocoanut tree, but does not adhere so firmly to the earth; whence the Palmyra tree is more easily blown down by the wind. If this tree grows 20 or 22 years it gives fruit, and it is said of it, that it can reach the age of 200 years, before it dies; and it has such a power of life in it, that the trunk, even when thrown down, will germinate anew, and send down roots, and produce new trunks, which also bear fruit, certainly in less numbers than common and ordinary trees.

During one year in Amboina, I was never able to observe well, at what time it gives ripe fruit; as they slowly or seldom germinate there, and I was always

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obliged to seek ripe fruits from other regions. I have however been told by others, that in the higher parts of ancient India, they ripen from July to September, which are the summer months there, when they fall spontaneously; and in Ceylon are diligently collected, and are afterwards used.

The *male Palmyra* is like the female in every respect, and is also observed to grow close to it, differing only in this, that it produces no fruit, but instead of it long and round *iuli*, (aments) bearing flowers, like the flowers of the Soccum or the Typha of Europe, but more hairy, of the length of a hand, or a little longer, and of the same colour; generally two such aments sprout at the same time, and rarely three; and these aments have their own peculiar flowers, which are small and white, consisting of three roundish, spoonlike petals, which have 5 stamens within, and which sprout from scales in the iuli, in an obliquely parallel order, having a pleasant smell but growing slowly:—These aments fall without fruit They grow as in the female, but higher in the top of the tree, among the highest branches; and they are of no other use than to strike fire, instead of tinder. The wood of the male is harder and blacker than that of the female, can be easily split longitudinally, is likewise hard and horny, and difficult to be rent transversely; hence a wound is easily made on those who work on it, by its sharp fibres. No liquor is drawn from this tree, except in cases of necessity or of some disease, as will be shewn hereafter. When the female springs from the nut, and also in transplanting, and in younger trees, they cannot be distinguished from the male, but they are suffered to grow together; and here and there amongst the female trees one or another male is left, because, it is said, it impregnates the females, and renders them productive. The trunks of the very old trees are better for use, as will be proved hereafter.

The Name. In Latin *Lontarus domestica tam femina, quam mas; et Jagarifera.* The Portuguese call it *Palmeira Brawa*, that is, the Wild Cocoa, but why I know not, because it requires human culture equally with the cocoanut tree; or (perhaps) they call it thus, since it grows more easily, and forms whole groves spontaneously. The Dutch call it *Jager-Boom* and *Palmeer-Boom*. In the Indostanee language, it has many names alotted to it, and in the *Hortus Malabaricus, cap.* 3 *fig.* 9., it is called by the Malabar name *Carimpana*. By the Brahmins it is called *Talatmado;* in Ceylon *Talagaha;* and I have understood from others that this tree is also called *Panamaram* by the Malabars: and in the Telingoo, which is a dialect of the same language, *Tatisjitu* or *Tatimanu;* by the people of Tanjore *Taluwritiam*, and by the people of the Deccan *Taarki Dizaar*. But the Malabars call the fruit by the peculiar name *Panagay* and *Tsjurgoy*. In the East it is known by the Malay name *Lontar*, and in some books erroneously *Lantor*. In Java it is called *Sualan*, and in Macasser *Talla*, whence *Julius Scaliger, Exercit.* 158. *Distinct.* 6. got his *Tal.* In Timora and the adjacent islands it is called *Coli.*

The drink procured from this tree has the same name as that from the cocoanut-tree, namely in Latin *Vinum Palmeum*, in Portuguese *Vinho de Palma*; in Indostanee *Sura* and *Syra*, which I have (*supra*, cap I.) derived from the Arabic *Seruh*, or more properly from the Persian *Schir*, and which signifies any thick liquor or syrup, and particularly any sweet liquor which is distilled or obtained from plants. Among the Malays it is called *Toacca*, and by those in this country *Touwak*, and by the people of Amboina and Timora *Tua*. The red sugar which is obtained, by boiling, from this juice, is in Indostan called Jagara, which is pronounced by some people, and by the French, Schagera; whence the ancients have doubtless derived *saccharum*, which occurs even now in the Malabar language, for

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the hard candied sugar they call *saccar*. The yellow juice expressed from the ripe fruit, and dried to the consistency of cheese, is called *Punat* and *Punato* by the Malabar. The leaves of this tree, as well as those of the Cocoanut-tree, are called *Ola*.

LOCALITY. This tree is for the most part found to the east of *Ceylon*, especially in the kingdom of *Jaffnapatam*, and from thence throughout the coast of Coromandel, as far as Oriva, and also in Java, but mostly in the eastern portion of it; in Madura, Balya, and further throughout that tract of islands as far as Timora. In Celebes also, there are vast woods of them about Gelissona and Mandura. A few are found in the eastern part of Cerama, and in Amboina here and there only a tree may be seen, which is cultivated as being rare and exotic. It is truly remarkable, that these two nuts of India, namely the Cocoanut and the Lontar, cherish such secret envy and hatred towards each other that they will not grow in one and the same region, nor in the same field. Which however must be attributed to the great wisdom of the Creator, who is unwilling that these trees so productive, and so necessary to the human race, should grow in the same region. For we see that in all the western part of Indostan and Ceylon, the Cocoanut tree grows abundantly and actively; but there we never or rarely see a Palmyra tree: on the contrary in the eastern part of Ceylon and in Coromandel the Palmyra predominates: in which places (however), as we have remarked above, the Cocoanut is exotic or very rare: and those few trees, which grow in these regions, are always in a peculiar place and solitary. It is true, that many places may be shewn, where both these trees grow together; but if compared to the others, they will be found less in number and always sickly. But I have seen in Amboina a Palmyra tree perfect and of full growth which had been cultivated with great labour, and was nevertheless always barren, from no other cause than that it stood amongst many Cocoanut-trees.

THE USES. The common or female Palmyra is cultivated either for its fruits or its beverage: but principally for the beverage; which is obtained in the same manner as we have said of the Cocoanut-tree; namely the flowering stem or Majang, called *Palé* by the Malabars; whilst it is yet in the sheath, is briskly rubbed, or is pressed by two pieces of wood, which are bound together like a forceps; and after 3 days the fore or half the lesser part is cut off; and being bent down it is bound to a branch to which is suspended a pot or Bambo, which is filled by the dropping during night; and daily a little slice of the majang is cut off, until the whole stem is consumed: and if this tree bears more majang, then the beverage can be collected from one stem and the fruit from another. If we wish to use this juice for drink, pure reeds or pots are to be hung up; but if it is desired to make sugar from it, then the inside of the pot is smeared with chunam which renders the *Sura* thicker, and preserves the sweetness; and hence they are wont to use some trees for the beverage and others for making sugar. This beverage is almost of the same nature as the liquor *Towak* drawn from the Cocoanut, but it is a little more red, and richer, and is hence more fit for making sugar of: it has also a peculiar flavour by which it can be easily distinguished from the liquor of the Cocoanut. And since the Singhalese in Ceylon and the Telengoos in Coromandel have to ascend this tree daily, they make peculiar belts and other helps for this purpose; namely, a rope-noose like a semicircle for the feet, with which they ascend the trees; a double belt round the body, by which hang two knives enclosed in a sheath and a pot filled with prepared chunam: and they have another pot in a basket made of twigs, in which they collect the distilled *Sura*; all which peculiarities have their alotted names in the Malabar

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language, and have been more fully and curiously described by others, and are therefore omitted here, as they are unknown in these countries.

The *Sura* is boiled over a fire slowly and gradually into a thick syrup called *Carpoene;* it is then poured into oblong baskets made of twigs, and dried in the smoke; and then a red, stringy sugar is obtained, properly called *Jagara.* The Javanese pour this syrup into small plates or dishes, Tampoerongs, bamboes or the like, and in these they dry like unto small loaves of sugar;—the hardest then they roll in leaves, and offer for sale; but such as are broken and of less value they put into baskets and mix with other sugar, which is made from the Saguero tree. This Palmyra sugar should be well preserved and kept at first in dry places; for it easily dissolves, and hence they are best formed into such small cakes or oblong sticks, for in this state they are better able to be kept in dry places.

This Palmyra-sugar is easily distinguished from the Saguero-sugar: the latter is black, dark and moist: the former is pale-brown and dry: they differ also in flavour; for the Palmyra-sugar is commonly eaten as food and with the hand, and hence in Java they are always made into small cakes or sticks. It often indeed tastes burnt, but this by no means from the saccharine, but from the preparation of it, and should be imputed to the use of too much fire. It has also been observed, that if it be eaten too greedily when newly made, it produces dysentery. But by the inhabitants it is esteemed most useful and suitable, to be mixed with medicines, as well as for a perfume called Astangi, to which it gives a grateful and pleasant odour.

In Ceylon and Coromandel the fruits are sought for more than in Java and these Oriental islands; for when they are half-ripe, while the shell is yet soft, they are torn off or cut from the tree, and stripped of the outer bark: the shell of it is then perforated with the finger, and then the soft kernel called Liplap can be sucked up, which is pleasant and exceedingly refreshing; but too large a quantity of it ought not to be taken, for it debilitates the stomach, and is hence injurious. The ripe fruits are more hurtful, whether they are eaten raw, or in the form of Poenata. When soft and ripe they may be eaten raw if the exterior rind is taken off, and the fibrous flesh pressed with the fingers, until the yellow juice is pressed out; and that which remains is sucked out, as in the ripe Mango. This juice is indeed sweet, but at the same time insipid. The remaining coir, or fibrous substance is thrown away with the nuts. But the, fruits unripe are roasted over a fire, until the juice penetrates through the rind, this is then peeled off, and the fruit, as we have said before, is eaten.

In, making Punata more labour is required, for after the ripe fruits, which fall from the tree from July to September, have been collected, the stalks and the *cups* are twisted off with the hands; the outer rind is stripped off, and the peeled fruit are washed in water, and cleansed from the adhering fibres and earth; they are then pressed out, and rubbed for a long time with other limpid water, until all the yellow juice has been drawn out; this is sometimes repeated twice or thrice, lest the juice should be lost; and it assumes a thick consistency; and the preparers with a hooked stick cleanse it from all the fibres of the shell; and then they prepare a machine made of sticks, which is here called *Parra Parra*, by the Malays *Lante Lante*, and in Malabar *Pandel*. On this machine they spread large palm-mats from 14 to 16 cubits long, on which they then pour out the liquor so thick, that scarcely a leaf of the mat can be seen—they then leave it to dry for one day, and on the next day they pour fresh juice, which is again left to dry, after repeating the same labour until this cake has acquired the thickness

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of three fingers; which labour is generally continued for 15 or 16 days; but these mats are folded up during night, and are covered with leaves, to preserve it from cats and dogs, who are exceedingly fond of this cake. When this becomes as hard as cheese, it is cut into square pieces or cakes, and they raise it gently from the mats with a Knife, and place them in layers in baskets, and sprinkle the layers with water in which salt has been dissolved.

And these baskets or sacks are placed on a three-legged stool, which they fasten by a rope to a beam, that for some days they may be impregnated with smoke; but this should not be done too much, lest the Punata should become bitter; they also place the ropes in such a manner, that mice cannot enter; and then this work is finished, and the *Punata* or *Poenata* so often mentioned is prepared—and this they reserve for use during winter. But all these things can be found more fully described with their Malabar names, in the curious writings of Mr. Herbert D'Jager, which existed in his time, and from which I have extracted these things.

The people of Maccassar prepare the fruit in a much more convenient manner, nor do they spend so much labour. When the juice has been only expressed, they pour it into large pans, and mix it with the farina of rice, and thence prepare many kinds of food. With them also the stones or nuts are in use, which during the preparation of Poenata are thrown by; they then dig a large but not deep pit, and into it they throw the little stones in such a manner that there may not be more than three layers of them; then they cover these with Ola, and sprinkle over them a little earth; and in this manner they remain during the rainy season; and if but little rain has fallen, they sometimes sprinkle water upon them, and then these stones send out long white roots or germs, an inch thick, and about a cubit long, like white parsnips, which are called *Colengu* by the Malabars, and these they dig out in the month of March, roast them over a fire, boil them in water, and eat them like potatoes.

They also break these roots in pieces and dry them in the sun or at a fire for some days, until they snap when bent, and these are then called *Oedijel*. And this Oedijel is then put into large basket, which are sewn, placed on tripods and exposed to the smoke, and the roots, when broken and dried, are eaten with punata as a common food. The little stones, which do not give good roots, contain a soft and delicate substance like the Palmita, which the Malabars call *Mita*, and is with them a pleasant food. These stones are broken, with the assistance of a *caito* or knife, into two fragments or parts, in order to get at the substance within; moreover from these dried roots they tear off a hard nerve or fibre and the roots they bruise into farina, called by them *Oediyel ma*, whence also another food is prepared, which they call *Poetoe*, which resembles the form of a radish, or a long roll; such, under that name, are made in these Islands also from the farina of Rice.

But the stones, which remain in this trench more than a year, and send forth at the proper time the above mentioned roots or *colengu*, afterwards spring forth and grow into plants. The shell of the nuts they burn into coal for the use of smiths, which give a great heat, but are soon consumed, and last but a short time.

The liquor, called *Sura*, is drawn from the male Palmyra abovementioned, a little at a time, and is only used for medicine;—for when taken on an empty stomach, it is useful to those who labour under consumption, Phthysis, Haemoptoa and Dysentery; for it has been found that some Europeans living in Ceylon, who laboured under these diseases which were pronounced incurable and were given up

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by our surgeons, were cured by this beverage, and, immediately after drinking it, were in a better condition.

The wood of both species is, as abovementioned, black, horny, striped with a few yellow veins, and spotted; otherwise it would be like Ebony in colour as in weight; but the wood of the male is always blacker and harder than that of the female, and on that account is more commonly used. The Cinghalese make small caskets from both, which have an excellent polish, and are more esteemed than the wood of the Cocoanut tree. They also make it into rafters for the roofs of houses, as well as into lattices for windows, which when polished are of a beautiful colour. The handles of the *Torani* are also made of it, as was said before of the *Saribo*, to which this wood has a great resemblance, although always heavier and blacker then the Saribo, and more like ebony. From the younger and white leaves of this tree, the Javanese, the people of Macasssar, and the Malays make paper for daily use, writing the letters with a style, and folding the leaves again with the natural folds. These leaves they perforate and tie with a thread as other people (in lands) where the Palmyra does not grow, do with the leaves of the Cocoanut tree. In the olden times, this method of writing upon leaves was more in use, but afterwards, when by the travellers and by means of commerce other species of paper were imported, paper of leaves gradually fell into disuse; so that for the most part letters are no longer written on such leaf-paper, except in Malabar and the neighbouring countries.

By the inhabitants of Macassar these leaves are so much esteemed, that none of the common people dare carry an umbrella or large broad-brimmed hat made of them; except the three highest noblemen in that country, namely, the Princes of Tello, of Goa, and of Sadrabona. They accordingly make umbrellas from the leaf of the Talla—all the radiï of which are interwoven with tinsel, and surrounded with a border of ebony, or even covered with Rottanga and silk, so that this broad-brimmed hat or umbrella is always open, and if they wish to carry it, they place it on a stick, the handle of which is covered with gold; and which it is not proper for their servants to carry without distinction behind the back;—this is permitted only to the nobles. Their neighbours, the Boegi, are wont to make umbrellas or shades from the sun, from these leaves, but they are made in quite another manner, and are so wrought, that they may be folded up. The common people also make from these leaves other household furniture, as chests and boxes to keep their provisions, and also bags which are filled with rice;—&c. From the younger white branches they also make *catupas* or tubes which they fill with boiled rice; and it is commonly thought that it will be more savoury than if the tube had been made of the Cocoanut-leaf. From the same leaves, likewise, the Boegi make certain smaller hats with a slender or scarcely any surrounding brim, called *Tsjilo Tsjilo*, which they wear throughout the day, and generally during rain. For they are so closely constructed, that no rain can penetrate them.

The inhabitants of Java, Baly, Timor and Rotthe use the liquor, *Sura*, more for sugar than for drink, from which also a syrup is first boiled, called *Gula* by them;—and this they afterwards keep in baskets or pans; in Timor and Rotthe however it is much used as a drink, which they called Tua, and which is much sought after, as they say that it does good to them both as food and drink.—For daily use they mix it with a certain quantity of water and hence they grow healthy and fat. They keep this in vessels made of Saribo leaves, in which also they suspend it in their houses and from which they who enter the house may drink as much as they desire to satisfy their thirst, even before they salute anybody: which is the custom of the country

The *Ampana* is described in the *Hort. Malab. cap* 4. *fig*. 10, and is there thought to be another *Carimpana*, or a species of the Lontar: it is no other than

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the Male Palmyra above spoken of, which the Malays call *Lontar Lacki Lacki*, not differing in form from the feminine, unless in this, that instead of fruits it bears long iuli, the flowers of which are accurately and fully described in the Hortus Malabaricus; with which I leave the reader, as the tree is unknown in this country. In this *Hortus*, it ought, I think, to be noticed, that the males are left among the females, in order to impregnate them and render them productive, and that hence the medicinal beverage, Sura, is obtained.

There is another black wood, like the male Palmyra, which is brought from Sabura and Passir, places situated in the eastern part of Borneo, and is called *Caju Boelian*; which being polished is black shaded with red, but without the reddish grooves which are observed in the Palmyra. Hence heavy blocks of it about two feet broad and a hand thick, which sink in water, are brought: this wood is much used for the head and foot of the Moorish sepulchres in Macassar; and is split into long parts for making their *pop*-guns, which guns are 5 feet long, and 2 fingers broad, round and smooth externally, and hollowed within less than a finger's breadth. With these the people of Macassar project their poisoned darts called by them *Sompit*, and among us called *Spatten*; of which a fuller description will be given at the end of the Third book.

OBSERVATION.

—oo—

The learned and accurate Rumphius in the description of this tree has remarked that the Ampana (*Hort. Malab. part* I. *tab.* 10) is the male Palmyra, and that the Carimpana (*H. Malab. part.* I. *tab.* 9.) is the female: but properly they are one and the same tree, growing from the same seed, like the male and female *Papaya*. There are other species of the Palm; and since pictures of both the male and the female have been very elegantly engraved in the *Hort. Malab.* I have annexed to this work only the female or fruit-bearing tree; which by the care of Rumphius was clearly and elegantly drawn. The Carimpana is annexed in the Hort. Malab. by the authors of which these splendid trees have been named, or by whom their natural characters, by which they are distinguished from others, have been defined. *By Paul Herman, in his Mus. Zeyl. pag.* 49. it is described as the "Palma Indica, called *Tal* or *Talgaha*; with a fleshy fruit enclosed in an eatable shell; and *Palma coccifera* with the leaf folded, the fruit smaller, Commel, Fl. Malab. p. 49." which is thought by *Ray*, in his *Hist.* pl. p. 1366. to be the *Palma Brava Femina Lusitanus*, and is called *Carimpana, Plumier nov. pl. gen.* p. 2. The characters of this difference between male and female are defined by Carol. Linn. in his Treatise on the *Musa Cliffort.* p. 13. where it is called the Borassus *mas* and *femina*. The names of Ceylonese and other well known authors, occur in *Thes. Zeyl. pag.* 181. It is briefly described under the name of Lontar, by Valent. in his *Beschryving van Amboina* p. 183.

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HAMILTON'S COMMENTARY ON RUMPHIUS.

Memoirs of the Wernerian Natural History Society Vol: V. for the years 1823—24. *Part II. Published in* 1826. *XX.—(But it should be XIX.) Commentary on the Herbarium Amboinense.*

BY FRANCIS HAMILTON M. D.

FELLOW &c. &c. &c. P. 314.

(*Read* 14*th June* 1823 *&c.*)

Liber primus.—Caput. ix.

Lontarus domestica, p. 4 5 *t.* 10.

Jussieu (Gen: Pl: 45) proposes to restore the name Lontarus, in place of Borassuss, the name given by Linnæus, and since adopted by most Botanists, but derived from the name of a part (spatha) common to most palms. The name *domestica* is well chosen, as I have never seen the palm except near villages; while *flabelliformis*, the specific name usually given since the time of Linnæus, is applicable to every species which can be considered nearly related to the same genus. I consider therefore, that Gærtner was perfectly justifiable in having (De Sem. i. 21) restored to this palm the name Lontarus *domestica.*—Indeed, it may be observed, that Linnæus changed the names given by Rumphius for the worse, and that the plan of making the generic name a substantive, agreeing with an adjective for a specific appellation, seems to have been borrowed from the venerable Dutch Governor, altho' Linnæus has generally received credit for the invention —No doubt, however, Linnæus followed the rule almost universally, while Rumphius only adopted it in a great proportion of instances.

Cap: x.—Lontarus Sylvestris, p. 53, II. This is a Corypha.—Dr. Rox: has placed it amongst them.—

Lontarus Sylvestris, yhuidicta, p. 54. A Palm; produces Sago—cannot discover to what it belongs from what Rumphius says.—

L. S. Cabang, p. 55. A palm nearly allied to *Liculia peltata.*

Cap: xi. L. S. altera, p. 56, t. 12. From the fruit containing three or four nuts, and from the general appearance of the plant, I consider it probable that this palm is a species of Borassus or Lontarus.—

Cap: xii. & xiii. Palma indica vinaria secunda, p. 57, t. 13.

Burman, in his Commentary considered this as a Chamærops; and the authors of the Encyclopedie (vi. 258), misled by Loureiro looked upon it as a Borassus, which obtained the specific name *gomutus.* Both Chamærops and Borassus having fan-shaped leaves, while those of the palm in question are pinnated, these arrangements were quite unnatural, no circumstance in this natural order producing such a change of appearance as the form of leaf. Dr. Roxburgh, accordingly, (Hort. Beng. 68), with great propriety, considered this as not belonging to any Linnæan genus, and, adopting one of the names used by Rumphius, called it Saguerus Rumphii; which I think preferable to the name Arenga given to it by Labillardiere (Enc, Meth. Supp. i. 441) and probably derived from Aren of the Javanese.

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ROXBURGH—CASIE CHITTY.

(From Roxburgh's Plants of Coromandel.)

TAB 71 & 72 BORASSUS FLABELLIFORMIS LINN. SPEC. PLANT. 1857.

Palmira Tree.

Patoo Taady is the Telinga name of the Male tree.

Penty, or Nama Taady, that of the female.

This, next to Caryota Urens, grows to be the largest Palm on this coast. It seems to thrive equally well on all soils, and situations; but when the growth of high land at a distance from the sea the wood is much stronger, and every way better. It flowers during the beginning of the hot season.

When the seeds are young they are a pleasant cooling jelly, much eaten by the natives, and the addition of a little sugar and rose water makes them extremely patatable. The pulp of the ripe fruit is also eaten by the natives.

The tree during the first part of the hot season yields a pretty large quantity of toddy (palm wine) which is thus procured. The spadix either male or female, is cut through, just below where it begins to be divided into branches, and the juice is received into earthen pots suspended for that purpose; but it is necessary that a small bit of the extremity of the divided spadix should be daily cut off, to remove the contracted dry extremities of the vessels, and facilitate the flow of fresh juice; the toddy is either drank fresh drawn from the tree or fermented for distillation or is boiled into a coarse kind of safa, or rob, called Jagery.

The wood of this palm near the circumference, when of sufficient age, (one hundred years or thereabouts) is remarkably hard, black, heavy and durable, and universally used for rafters in pent-roofed houses, for which purpose it is certainly the first wood in India. The centre is soft and spongy, containing little else than a coarse kind of farinaceous matter, intermixed with some soft, white, woody fibres and is cut out, as the black exterior hard part only is employed.

By the natives the leaves are universally used for writing upon with an iron style or bodkin. They are also employed for thatching houses, for making small baskets, mats &c. and are formed into large fans called vissaries.

SIMON CASIE CHITTY'S GAZETTEER OF CEYLON.

Page 39 &c. &c. The Palmyra which flourishes in great perfection, particularly in the province of Jaffna, is equally as profitable as the Cocoanut, and is the subject of a poem in Tamul, entitled "*Tála Vilásom*"; from which it appears, that it may be applied to eight hundred and one different purposes; but the limits prescribed to this work, will not permit of their detail. The leaves, like those of the cocoanut, serve to thatch the native huts, as a substitute for paper, and for making mats, winnows and fans. *Odils* are the dried roots of this tree; and *punattoo* is a jelly prepared from the fruit, on which a great proportion of the poorer classes subsist when the crops fail.* The toddy is used as a beverage, and for making jaggery. The timber of the Palmyra is much esteemed for rafters, and is exported in large quantities to the continent.

* Page 103. Jaffna contains very few Cocoanut Plantations, but this deficiency is supplied by a great number of Palmyra trees, the fruit and roots of which, form a material portion of the diet of the inhabitants, while the leaves serve as thatch for houses, as a substitute for paper, and for making mats, baskets, winnows and fans, and the timber is used in building.

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MAJOR FORBES'S ELEVEN YEARS IN CEYLON.

Vol: 1. P. 248.

(Writing of Kondatchie.)

"The ground here is low, and consists of sand and clay covered with stunted prickly Jungle; a few tattered coconut trees looked like exiles in an uncongenial clime; yet even in their drooping state they were less annoying to the eye than the unvarying stiffness of the *palmyra tree* palm, and struck me as retaining over them that advantage of appearance which the dishevelled ringlets of a mop, if planted on its handle, would possess over a furze broom in the same predicament. See p. 249—Instead of a large town found natives sleeping under or beside 2 or 3 palmyra leaves supported on one side to the height of 3 feet—see also vol: 2. p. 243 for interesting facts on leaves &c.

PERCIVAL'S CEYLON—P. 330.

The *Palm* or *Palmira* tree resembles the Cocoa, but is much inferior to it in utility. The leaves are thicker and shorter than those of the former, and fold up like a fan, in which form they are used by the natives to write on.—A tough whitish skin, like that found on the betel, covers the body of the tree, and is also employed by the natives to hold their liquor.—The Nut contains a sort of milk; and by incision the body of the tree affords a very pleasant liquor, not so strong or intoxicating as toddy.

(From the Encyclopedia Perthensis.)

PALMYRA.

Borassus, in botany, a genus of plants described by Linnæus, but not classed. The male and female flowers grow on separate plants, and give the plant such a different figure (In flowers only. W. F.), that they are called by differents names, in the Hortus Malabaricus; the male being called Ampana, and the female Carimpana. The male has for the cup of its flower the whole compound spathta, which is amentaceous and imbricated; the flower is divided into 3 segments, the petals being hollowed, and of an oval figure: the stamina are 6 thick filaments, and the antheræ are thick and striated. In the female the cup is the same as in the male, but the petals of the flower, which is divided into 3 parts in the manner of the male, are very small, of a roundish figure, and remain when the pistil &c. fall off. The germen of the pistil is roundish; the styles are 3, and small, and the stigmata are small; the fruit is a roundish obtuse berry, of a rigid structure, and containing only one cell; the seeds are 3, and of an oval compressed figure.—

Ency: Metrop: Vol, 25 P. 421.

Tala, used by the old botanists for the *Sesamum Orientale*, is a slight corruption of Tîlà the Sanskrit name of that plant; but Tála, (Borassus Flabelliformis) the fermented and inebriating juice of which is called tádé, (spelt by us Toddy.) The second consonant of this word is the Indian palatal *d*, often pronounced *n*, and thence changed into *l*, so that Táda becomes Tàra and Tála.

Vol. 3. No. 4 for April 1849 of the JOURNAL OF THE INDIAN ARCHIPELAGO AND EASTERN ASIA.—

Article :—The language and literature of the Island of Bali.
By R. Freiderich.

* * The time at which the manscript was composed, which I made use of, is the year of Saka 1724 (corresponding to the year of Christ 1802). To judge from the outward appearance I should have taken it to be much older; in 46 years the lontar-leaves (Boras: flab: W. F.) have already become much injured and it seems to prove what is said also of Indian manuscripts, that they can't survive 100 years. This probably is also one of the causes that in Java, in so short a time, almost the whole of the ancient literature was lost, and that when the desire for the old literature was revived, hardly any of the old manuscripts could be discovered. In Bali also we must not look for old manuscripts; however those which are guarded and transcribed in the families of the priests, may almost be considered as original, since in these families the knowledge of language and religion is preserved with the minutest care. Some faults are of course also possible here.—

BRANDE'S ENCYC. P. 155.

BORASSUS. (Gr. the skin of the date). A genus of palm-trees, usually called fan-palms, because their gigantic leaves are formed of plates radiating from the top of the petiole, and folded up after the manner of a Lady's fan. *Borassus flabelliformis* is an Indian species, with a trunk from 30 to 50 feet high, and leaves with from 70 to 80 rays—The Hindoos consider it the King of trees. A most intoxicating liquor is obtained by fermenting its sap, which is also capable of yielding Sugar in considerable quantity under proper management.

PEN: CYC: Vol: 4. P. 439, 2nd Col: BIRMAN EMPIRE.

Cocoa and areca palms are not frequent; but the palmyra, or *Borassus flabelliformis*, forms immense groves in the valley of the Irrawaddie. Its wine, when inspissated, gives a cheap but impure sugar, which is universally consumed, partly like that of the cane, and partly for the preparation of a strong sugar.—

ASIATIC RESEARCHES, BENGAL; VOL: IV. P. 231. LONDON 1807.
BOTANICAL OBSERVATIONS ON SELECT INDIAN PLANTS, BY THE LATE PRESIDENT,
SIR W. JONES.

No. 76. Tala Trinrajan.
Linn. Borassus.—

This magnificent palm is justly entitled the King of its order, which the *Hindoos* call *trina druma*, or grass-trees.—Van Rheede (? Hort: Mal.) mentions the bluish gelatinous, pellucid substance of the young *seeds*, which, in the hot season is cooling, and agreeable to the taste; but the liquor extracted from the tree is the most seducing and pernicious of intoxicating vegetable juices: when just drawn it is as pleasant as *Poubon* water fresh from the spring and almost equal to the best mild *Champaigne*. From this liquor according to *Rheede*, Sugar is extracted; and it would be happy for these provinces, if it were always applied to so innocent a purpose

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FORBES'S ORIENTAL MEMOIRS; VOL: 2. P. 62.

The Palmyra, or brab-tree flourishes on the banks of the Nerbudda and many Guzerat rivers. The Coco Nut tree does not grow in the interior districts, nor is it abundant on the sea-coasts so far North. The palmyrah, like the rest of that beautiful genus, gives an Oriental costume to the landscape, and is a tree of long duration, it sows itself from the seed contained within its semi-transparent fruit when it falls from the tree, or is dispersed by birds or monkies. A palmyra tree, when in perfection yields about 3 quarts of tari or palm-wine; this when boiled down produces a lb. of coarse sugar called Jaggaree, which is also made of a better quality from the juice of the sugar cane.

IBID. P. 201. (CLOSE TO AMEDAHAD.)

Among a variety, of trees still remaining was a very uncommon species of the palmyra tree; after growing up in a straight stem, to a considerable height, like others of that genus, it shot forth upwards of forty branches with a tuft of spreading leaves at the extremity of each branch, like the common borassus flabelliformis: this tree was esteemed a great curiosity and visited by most travellers, who, like myself had perhaps never seen any but the usual palmyra or brab-tree, which has only branches and leaves on the summit of a straight single stem, forty or fifty feet from the ground.—(This was on a small Island in a lake called Kokarea not far from the city wall.)

NOTICES OF LOMBOK IN JOURNAL OF THE INDIAN ARCHIPELAGO: VOL. II No. 3. P. 161.

The two writings in the Balinese are scratched with knives on *Lontar* leaves, and this is the material on which their ancient laws are preserved, and which, to this day, is exclusively used in all their writings.—In Java the palm leaf has long been superseded by paper.

FROM THE MILLION OF FACTS.

American Sugar Maple tree known to give 23 Gallons sap a day or 5 lbs. of sugar 184 pints.—Jagaree tree or Kittool (Caryota urens) gives 100 pints in 24 hours in Bengal.

PEN: CYC. VOL. 5. P. 187. BORNEO.

The Areca palm is extensively planted, and its fruit eaten both in its unripe and mature state; in the latter it is a great object of commerce. Another palm-tree cultivated here is the Sagwire * or Gomute [*Borassus flabelliformis*], which affords the principal supply of that saccharine liquor, which is used as a beverage and for the extraction of sugar; the interior of the fruit is used by the Chinese as a sweetmeat.

* The *Sagwine* or *Gomuti* of Borneo is the *Saguerus Rumphii* of Rox: and this is the tree probably meant.

COLOMBO:—PRINTED AT THE OBSERVER PRESS.

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